CIVIL DISTRICT COURT
PARISH OF ORLEANS
STATE OF LOUISIANA

GLORIA SCOTT AND DEANIA JACKSON	*	
	*	NO. 96-8461
VERSUS	*	DIVISION "I"
	*	SECTION 14
THE AMERICAN TOBACCO COMPANY, INC., ET AL.	*	

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Transcript of proceedings before The Honorable Richard J. Ganucheau, Judge Pro Tempore, Civil District Court, Parish of Orleans, State of Louisiana, 421 Loyola Avenue, New Orleans, Louisiana 70112, commencing on June 18, 2001.

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Tuesday Afternoon Session
May 6, 2003
12:35 p.m.

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HUFFMAN & ROBINSON, INC., CERTIFIED COURT REPORTERS
New Orleans, Louisiana (504) 525-1753

APPEARANCES:

HERMAN, HERMAN, KATZ AND COTLAR, L.L.P.
Attorneys at Law
(By: Russ M. Herman, Esquire)
820 O'Keefe Avenue
New Orleans, Louisiana 70113

- AND -

BRUNO AND BRUNO
Attorneys at Law
(By: Joseph M. Bruno, Esquire)
855 Baronne Street
New Orleans, Louisiana 70113

- AND -

LEGER AND MESTAYER
Attorneys at Law
(By: Walter J. Leger, Jr., Esquire
Christine L. DeSue, Esquire)
9th Floor
600 Carondelet Street
New Orleans, Louisiana 70130

- AND -

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GERTLER, GERTLER, VINCENT AND PLOTKIN, L.L.P.
Attorneys at Law
(By: Michael H. Gertler, Esquire
Louis L. Gertler, Esquire)
127-129 Carondelet Street
New Orleans, Louisiana 70130

- AND -

MURRAY LAW FIRM, APLC
Attorneys at Law
(By: Stephen B. Murray, Esquire)
Suite 2550
909 Poydras Street
New Orleans, Louisiana 70112

- AND -

BENCOMO AND ASSOCIATES
Attorneys at Law
(By: Raul R. Bencomo, Esquire)
Suite 2110, One Poydras Plaza
639 Loyola Avenue
New Orleans, Louisiana 70113
(Attorneys for the Plaintiffs)

JONES DAY
Attorneys at Law
(By: Mark A. Belasic, Esquire)
North Point
901 Lakeside Avenue
Cleveland, Ohio 44114-1190

- AND -

STONE PIGMAN WALTHER WITTMANN, L.L.C.
Attorneys at Law
(By: Phillip A. Wittmann, Esquire)
546 Carondelet Street
New Orleans, Louisiana 70130
(Attorneys for the Defendant,
R. J. Reynolds Tobacco Company)

KING AND SPALDING
Attorneys at Law
(By: Richard A. Schneider, Esquire
Jack M. Williams, Esquire)
191 Peachtree Street
Atlanta, Georgia 30303-1763
(Attorneys for the Defendant,
Brown and Williamson Tobacco
Corporation, individually and
as successor by merger to
The American Tobacco Company)

ADAMS AND REESE, L.L.P.
Attorneys at Law
(By: Charles F. Gay, Jr., Esquire
Ronald J. Sholes, Esquire)
Suite 4500, One Shell Square
701 Poydras Street
New Orleans, Louisiana 70139

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(Attorneys for the Defendant,
Philip Morris, Incorporated)

SHOOK, HARDY AND BACON, L.L.P.
Attorneys at Law
(By: Gary R. Long, Esquire)
One Kansas City Place
1200 Main Street
Kansas City, Missouri 64105-2118

- AND -

GORDON, ARATA, McCOLLAM, DUPLANTIS
AND EAGAN, L.L.P.
Attorneys at Law
(By: Steven W. Copley, Esquire)
Suite 4000
201 St. Charles Avenue
New Orleans, Louisiana 70170-4000
(Attorneys for the Defendant,
Lorillard Tobacco Company)

SPECIAL MASTER:
Dominic J. Gianna, Esquire
Middleberg, Riddle and Gianna
Suite 3100
201 St. Charles Avenue
New Orleans, Louisiana 70170-3100

REPORTED BY:
CHERYL FOURNET HUFFMAN, RMR, CRR
Registered Merit Reporter
Certified Realtime Reporter
(No. 75009)
Huffman & Robinson, Inc.
One Shell Square, Suite 250 Annex
New Orleans, Louisiana 70139
(504) 525-1753 (800) 749-1753

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I N D E X

WITNESS: PAGE

DAVID E. TOWNSEND, Ph.D.

CONTINUED DIRECT EXAMINATION
BY MR. BELASIC.....19962

P R O C E E D I N G S

THE BAILIFF:
All rise for the jury, please.
(Whereupon the jury joins the proceedings at this time.)
THE MINUTE CLERK:
All rise, please. Recess is over. Court will come to order. Please be seated.
THE COURT:
Good afternoon.
THE COUNSEL:
Good afternoon, Your Honor.
THE COURT:
Counsel, approach the bench, please.
(Whereupon a bench conference is held at this time as follows:)
THE COURT:
I have a request from plaintiffs to

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inquire as to whether there are any fact witnesses in the courtroom?

MR. BENCOMO:

Are there, if you know? Because I know you've got some -- Do you know, Doc?

MR. SCHNEIDER:

No.

MR. BENCOMO:

Okay. I mean, that's fine.

THE COURT:

None?

MR. BENCOMO:

That's fine. Okay. Thank you.

(Whereupon the bench conference is

concluded at this time.)

THE COURT:

None.

Mr. Belasic, are you ready to continue?

MR. BELASIC:

Yes, Your Honor, I am.

THE COURT:

Proceed.

MR. BELASIC:

Good afternoon, Your Honor.

Good afternoon, ladies and gentlemen of the jury.

CONTINUED DIRECT EXAMINATION

BY MR. BELASIC:

Q. Dr. Townsend, when we left off, you had shown a drawing that you did of the modern cigarette, then we talked a little bit about what was in cigarette smoke.

As an example of what is in smoke, have you prepared a demonstrative exhibit of the smoke composition of the typical Winston cigarette that Reynolds makes?

A. Yes, I have.

Q. And would that help you in explaining the type of chemicals that are in smoke to the jury?

A. Yes, it would.

MR. BELASIC:

I call for DEA-000643.

MR. BENCOMO:

No objection to the demonstrative, Your Honor.

MR. BELASIC:

May we publish then, Your Honor?

THE COURT:

You may publish.

EXAMINATION BY MR. BELASIC:

Q. Doctor, I see a pie chart of some sort. Can you tell us what this is?

A. Yes, I'd be happy to.

This represents a fairly simplistic view of the smoke chemistry from a Winston 85 cigarette. And mainstream refers to that smoke that comes out of the mouth end of the cigarette through the

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filter.
Q. If I could interrupt, Dr. Townsend, can you tell the jury what "85" means?
A. That's an 85-millimeter long. That's a Winston, essentially, a Winston red soft pack.
Q. Is that a regular length cigarette?
A. A regular length cigarette.
And in this depiction of the smoke composition, as I said, it's somewhat simplified. But if one looks at the weight of smoke that comes out of the end of the cigarette, we find that roughly 60 percent of that weight is nitrogen and about 16 percent is oxygen.
So that, of course, comes from the air that's drawn into the cigarette both through the vent holes, through the cigarette paper and, to a degree, through the combustion zone.
There's about 3.8 percent by way of tar. And tar is a defined number as measured by the FTC method. There's about .3 percent nicotine. There's a little bit of carbon monoxide, about 3.7 percent;

carbon dioxide, 11 percent. And that comes from the combustion of the tobacco, carbon dioxide and carbon monoxide. There's a small amount of other air components, like argon, that's naturally present in the air. There's a couple percent of water. And then a very complex mixture of other gas phase components, about 1.6 percent, a little less than 2 percent; and that represents a lot of -- a large number of gas-phase or vapor-phase compounds. The tar, I'll point out, while it's 3.8 percent, that represents certainly thousands of different compounds that are present in the tar.
Q. Okay. Dr. Townsend, do you see that nicotine is 0.3 percent?
A. Yes.
Q. So would I be correct then that nicotine, at least by weight, is about 1/300th of the smoke?
A. That's right.
Q. One part in 300?
A. One part in 300.
Q. Now, which of these types of chemicals have you and R. J. Reynolds concentrated on in your efforts to reduce the risks of smoking?
A. To reduce the risks of smoking, we've certainly concentrated on the many components of tar, the many constituents that are present in tar; we've concentrated on nicotine; these other gas-phase components, which is a very complex mixture of vapor-phase compounds; and, to a degree, carbon monoxide. So tar, nicotine, gas-phase components, carbon monoxide.
Q. Now, the term that we've used a lot -- I'm

not sure it's ever been fully defined -- both of us and other witnesses have talked about constituents. When you say "constituents" of smoke, what exactly do you mean by that term?

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A. A constituent of smoke is essentially a chemical compound that's present in smoke.
Q. Okay. So if we talk about the chemical compounds, that means the same thing as constituents for these purposes?
A. Yes.

MR. BELASIC:
Bert, you can take that down. Thank you.

EXAMINATION BY MR. BELASIC:
Q. Back to this first topic that we're going to talk about, Reynolds' efforts to reduce general risks of smoking, just to be clear for the jury, has Reynolds definitely made an effort for the last fifty years to try to actually make smoking less risky?
A. Absolutely.
Q. Now, how have these smoking and health issues, some of which were mentioned by Mr. Bencomo, influenced your cigarette design toward that end?
A. Well, the smoking and health issues have had a direct impact on cigarette designs in attempts to make safer cigarettes.

The smoking and health issues and the science around that has essentially defined certain hypotheses about why cigarette smoke or what in cigarette smoke may be responsible for the significant risk. And we've looked to those

hypotheses and then turned to cigarette design to see how we can reduce or eliminate those compounds.
Q. So if someone said that the tobacco industry just buried their head in the sand while there was all this criticism and all this publicity about the risks of disease, would that be true?
A. Oh, I disagree with that completely.
Q. And it's been reflected in your cigarette design?
A. Absolutely.
Q. Now, you've talked about the public health reports that you've reviewed from the Surgeon General, the medical journals on down.

Does the public health literature provide any guidance for Reynolds in how to make a safer or a decreased risk cigarette?
A. Well, it provides -- it provides some clear guidance in developing the various hypotheses. It's clear from the epidemiology that cigarette smoking is a strong risk that leads to a number of hypotheses that we take from the public health community, from the medical literature, and try to see what we can do with cigarette design to reduce those compounds that are thought to be a problem.

It's interesting, though, that the medical research and scientific research has not, even today, zeroed down and said, "Yes, this is clearly one compound or one class of compounds that is a major reason for the risk."
Q. So there isn't some manual that you can turn to as a cigarette designer that will say, "Here's the safe or safer cigarette"?

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A. No, there isn't, actually.
Q. Has the government ever set, for example, a list of standards that, if you did that, it would be become a safer cigarette?
A. No.
And in that vacuum, because neither science nor the government has defined what a safer cigarette is, we at Reynolds have set about trying to define ourselves what constitutes a reduced risk cigarette, what types of tests must you conduct to demonstrate that there is reduced risk.
Q. Okay. When you looked at the public health literature and it talked about some of these compounds or constituents, was that at least a guideline?
A. It was guidance, yes.
And we've taken those theories, essentially accepted them as if they were true, and then go into the laboratory to test it to see what we can do with cigarette design.
Q. Were all the reports and all the suggestions about what chemical compounds in smoke could cause cancer or could be harmful, were they always consistent on what should be done to the smoke?
A. No, they weren't consistent, really, at all. I think there were a number of very good theories, many of which we still are investigating today. And I think the scientific community is. But they weren't consistent.
Some laboratories, some researchers, believed that certain classes or types of compounds were very important; other researchers focused on other

compounds or other classes of chemicals.
Q. And can these recommendations contradict themselves at times?
A. In some cases they can, yes.
Q. All right. Do you have any examples for the jury?
A. Well, yeah.
There was one argument that benzo(a)pyrene, a polycyclic aromatic hydrocarbon, was probably involved in the development of lung cancer. A reasonable hypothesis because benzo(a)pyrene had already been shown to produce tumors on mouse skin painting studies on the backs of mice. And benzo(a)pyrene was thought to be present in cigarette smoke because it comes from combustion. Any kind of combustion process, whether it's the burning cigarette or burning leaves, will generate some benzo(a)pyrene.
So it was reasonable to speculate that benzo(a)pyrene might be responsible or, in part, contribute to the development of lung cancer. And so some scientists investigated or evaluated that and said, "We think if you add certain additives to tobacco, like nitrates, you can reduce benzo(a)pyrene." And, to a degree, that can have a

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fairly small effect as it turns out through the experiments.

But, also, adding nitrate will increase another type of compound called tobacco-specific nitrosamines, which are also thought to be involved in, at least by some scientists, to be involved in the production of cancer.

So you can do something to the cigarette design to reduce benzo(a)pyrene, and that ought to be good, less ought to be better, but the consequence is you can increase the tobacco-specific nitrosamines.

Q. Well, what about nicotine? Has the public health community and the public health literature given suggestions as to what should be done to the amount of nicotine in a typical cigarette?

A. Yeah, there have been a number of suggestions. And in different directions, actually. Some scientists have advocated making a very low-nicotine cigarette, and even a no-nicotine cigarette, and that that ought to represent a safer cigarette.

Other scientists have recommended that you maintain the current level of nicotine, or even increase it, and reduce the tar as much as possible because their speculation is that it's components in the tar that may cause cancer.

So if you maintain some moderate level of nicotine, you can maintain consumer acceptability of those products, people will keep smoking them, reduce the tar as much as possible, that might be a safer cigarette.

Q. So even in the public health community, some of these critics and some of these researchers can contradict themselves as to whether you should decrease or increase nicotine?

A. Yes.

Q. You're familiar, aren't you, with the fact that Drs. Henningfield and Benowitz say that you

should decrease nicotine?

A. Yes, Henningfield and Benowitz both say that.

Q. And you know that Dr. Farone, who testified for plaintiffs, said "We ought to increase the nicotine in cigarettes"?

A. I'm aware of that.

And a number of scientists have also advocated that, including the Surgeon General, Professor Gori, Professor Russell in England and others.

Q. You can't do both in the same cigarette; can you?

A. Well, no.

Q. Whichever choice you make, one side will criticize you; won't they?

A. Right.

Q. Have you prepared another slide that shows a summary of the general ways in which Reynolds has

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sought to reduce the risks of smoking?
A. Yes, I have.
Q. And would that help you explain to the jury what you've done at Reynolds?
A. Yes.
MR. BELASIC:
Could we put up DDA-000618 for the Judge and the witness, please?
EXAMINATION BY MR. BELASIC:
Q. And is that a list of the methods of risk reduction that you have prepared, Dr. Townsend?
A. They're the major methods of going about reducing the risks of smoking.
Q. It's not every one, but these are the general

categories we're going to talk about?
A. These are the categories, yes.
MR. BELASIC:
Move to publish, Your Honor.
MR. BENCOMO:
No objection to the demonstrative, Your Honor.
THE COURT:
You can publish it.
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, let's take them one at a time.
When you say that these are the "Major Efforts to Reduce Risk," you mean the risks of smoking; correct?
A. Yes.
Q. And what do you mean by "General Reduction"?
A. Well, general reduction is one approach to reducing the risks by trying to reduce all of the compounds in tar or in smoke pretty much to the same degree. It's reducing tar level, reducing the gas phase level, and thereby you're reducing all of the chemical compounds pretty much to the same degree.
Q. When did Reynolds start doing research on this general reduction?
A. In the early 1950s.
Q. Okay. And when did Reynolds put that research into practice in cigarette design?
A. It began in the 1950s.
Q. Can you tell us what "Selective Reduction" is and what Reynolds has done in that regard?
A. Sure.
Selective reduction is a slightly different

approach compared to general reduction. Selective reduction hinges on the idea that there is a compound or a class of compounds that if you go in and remove just that, and you keep the same level of tar, but you're just taking out certain compounds, that that would reduce the risks. Say, as if you go into a very complex mixture with a scalpel and take that compound out. So that's selective reduction.
Q. Okay. We will talk about the other two efforts later.
You can take that down, Bert.

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I'd like to talk to you more about general reduction.

Have you also prepared a slide that gives the specific types of techniques that Reynolds has done for this general reduction in their cigarettes?

A. Yes.

MR. BELASIC:

Could we put up DDA-000619?

EXAMINATION BY MR. BELASIC:

Q. And is this an illustration of the methods that Reynolds has used for general reduction?

A. Yes, it is.

Q. And would it help you in explaining to the jury what Reynolds has done?

A. Yes.

MR. BELASIC:

Okay. Move to publish, Your Honor.

MR. BENCOMO:

No objection to the demonstrative, Your Honor.

THE COURT:

You may publish it.

EXAMINATION BY MR. BELASIC:

Q. Can you tell us, Dr. Townsend, what this chart means and what you were illustrating?

A. Yes.

This chart shows the major approaches to general reduction for the purpose of reducing risks. And it includes, probably pretty obviously, the use of filters and more efficient filters; the use of a processed tobacco called reconstituted tobacco; the use of a processed tobacco called expanded tobacco; reducing the circumference of the cigarette essentially results in burning less tobacco, so you generate less tar and less -- fewer compounds; the use of filter ventilation, sometimes called air dilution, will reduce the tar levels and the gas phase levels; the use of porous or more porous cigarette papers is actually a form of air dilution. It allows air to come in through the cigarette paper, dilute the smoke, so you're actually generating less smoke at the fire cone end. And then the use of faster burning papers, that is, it will reduce the number of puffs that's gotten off the cigarette and, thereby, reduce the tar level.

Q. Now, Dr. Townsend, has Reynolds actually used each of these techniques in the cigarettes that they sell commercially?

A. Yes, we have.

Q. And have they been successful in reducing exposure to tar and nicotine?

A. We've had major successes at reducing the tar and nicotine level.

MR. BELASIC:

You can take that down, Bert. Thank you.

EXAMINATION BY MR. BELASIC:

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Q. The first thing you had on the chart was filters. And you described it briefly. Everyone knows what a filter is. But are filters an effective general reduction technique for reducing the inherent risks of smoking?
A. Cigarette filters are extremely effective in reducing the yields and, as a result, reducing the risks.
Q. Okay. How do filters work?
A. How do filters work?
It's very complicated how filters work. But there's basically a bundle of fibers that are made into the filter that's put on the mouth end of the cigarette. And those fibers are extremely small. And they actually trap or capture these little liquid smoke particles that we talked about earlier this morning.
Q. And did you prepare a chart that shows some of the different methods of filtration?
A. Yes, I did.
Q. And would that help you in explaining to the jury how filters trap those tar particles?
A. Sure.
MR. BELASIC:
Could we put up DDA-000638, please?
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, is this an illustration of the various methods of filtration that are used in

cigarette filters?
A. Yes.
MR. BELASIC:
Move to publish, Your Honor.
MR. BENCOMO:
No objection to the demonstrative.
THE COURT:
You may publish it.
EXAMINATION BY MR. BELASIC:
Q. Doctor, can you explain -- I see diffusional, inertial impact. Nobody probably knows what you're talking about. Can you use this to explain how filters work?
A. Yeah, I'd be glad to.
First of all, the physics of particle catch are in a fiber filter. It's pretty complex, and the mathematics that go with it are fairly complex. And so this is really pretty simplified.
But what I've tried to do is represent, with this round circle, it's a cross-section of a filter fiber. So we take one fiber that's in the filter and look at a cross-section of it. And around that fiber, as smoke travels through the filter, you see there are streamlines that go around the fiber.
Now, as the smoke goes around the fiber, these little liquid particles can do one of several things. First, a liquid particle can follow the streamline and, because of its mass -- its momentum, actually -- either by virtue of the velocity or its mass, it actually just collides with the front edge of the fiber. And you see that, once it collides, because it's liquid, it sticks. And we call that

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mechanism of capture inertial impaction because it's impacting on the front edge of the fiber.

Now, the other -- another mechanism is called interception. And in that, the liquid droplet just follows along the streamline. And as it goes around the fiber, it just touches. So the streamline it's following is so close to the fiber that it just touches and it sticks and it's captured.

Now, the third mechanism we call diffusional deposition. In that, the particle is moving at a pretty fair distance away from the fiber, so it's not going to touch the fiber because of the streamline it's following. But because these particles are extremely small, they're around two-tenths of a micron or two-tenths of a millionth of a meter in diameter, they're very small and so they can undergo random movement. We call that Brownian diffusion.

So there's a probability that it can sidestep as it's following this streamline. And so diffusional deposition is where that small particle does actually sidestep and collide with the filter fiber and stick.

Those are the three major mechanisms of filter -- filtration of small particles.

Q. So there is a substantial science behind the design of cigarette filters?

A. It's a pretty complicated science, actually, yes.

Q. You're not just taking a plug of cellulose and sticking it into the tobacco rod?

A. No.

In designing a filter, you need to know how fibers remove particles and actually design the filter accordingly.

Q. Now, Reynolds has used many different types of filters; haven't they?

A. Yes.

Q. And have you prepared a chart that shows the different types of filters that Reynolds uses in its cigarettes?

A. Yes, I have.

MR. BELASIC:

Your Honor, could we put up Exhibit DDA-000635, another demonstrative?

EXAMINATION BY MR. BELASIC:

Q. Again, is that an illustration of different types of filters that have either been used or evaluated by Reynolds over the years?

A. Yes, it is.

Q. Would it help you in explaining your testimony on this issue?

A. Yes.

MR. BELASIC:

Your Honor, move to publish.

MR. BENCOMO:

No objection to the demonstrative.

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THE COURT:
You may publish it.
EXAMINATION BY MR. BELASIC:
Q. Doctor, could you describe the different types of filter modifications that are pictured up here?
A. Yes.

This shows some of the filter modifications that have been made as a result of the research. And the first is looking at different types of materials: Cellulose acetate is the most common material that's used as a fiber in cigarette filters; but paper, folded paper webs, have been used as other -- another type of material; polypropylene webs, polypropylene fibers and a whole host of different types of materials.

The shape of the fiber is actually very important. And you remember on the last exhibit, I showed you a cross-section of a round filter fiber? Well, we don't really use round filter fibers; we use fibers that are made with specific cross-sectional shapes like a Y shape or an I-beam shape. And the reason is because that increases the surface area and will increase the removal efficiency or the trapping efficiency, if you will, of these little particles. So that's another modification.

Increasing the filter density, the fiber density inside the filter, is a very important modification. And that stands to reason. Obviously, if you increase the density, you're packing more fibers inside that -- inside that filter. More fibers then will remove more particles or more tar.

Going to longer filters, of course, is an important modification. Longer filters remove more tar.

And specialized filter shapes sometimes can alter the filtration efficiency as well.

Q. How long has Reynolds been doing this

research and development on different types of filters?

A. Since the fifties. We first marketed a major -- The first major filtered cigarette in 1954. And that was Winston.

Q. Now, is there any limit to the amount of filtration, the amount of tar, that you can block with a filter?

A. Well, not really. You can design a filter that will remove all the tar, essentially all the tar. What we find is that if you do that, the cigarettes that are made are not consumer acceptable.

First of all, the filter is so hard to draw smoke through or to draw air through that it's like -- it's like drinking a milkshake through a real small straw. So it's very hard to draw through.

The second thing is if you remove all the

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tar, there is no taste. And consumers just don't like it.
Q. Okay. Then how do you determine what type of filter to put on a cigarette that people would actually buy?
A. Well, we have to make the right combination of filter modifications or filter modification types and, actually, we design cigarettes to a particular tar level. So if we're making or developing a new ultra low tar cigarette at a five-milligram tar level, we can go in and design a specific filter that will accomplish that. And, in particular, in combination with other general reduction techniques like air dilution, expanded tobacco, essentially

develop an entire cigarette design that delivers the desired tar yield.
Q. Well, can't you do enough research that you can come up with a filter that could filter out all the tar but still be acceptable to smokers?
A. No.
Q. That can't be done?
A. We've actually developed cigarettes that are extremely low tar levels in a combination with filter -- very efficient filters and high air dilution levels. And what we find is that those products are not acceptable in the marketplace.
Q. And, again, why not?
A. Because there's very little taste. There's, you know, at that extremely low level of tar yield, there's essentially no taste and consumers don't like them.

MR. BELASIC:
Okay. We can take that exhibit down.

EXAMINATION BY MR. BELASIC:
Q. One of the general reduction techniques that you show and that the jury has heard about is reconstituted tobacco.
A. Yes.
Q. Now, plaintiffs' witnesses have talked about it. But can you briefly remind the jury what this reconstituted tobacco is?
A. Sure.
Reconstituted tobacco was actually a process that was invented by Reynolds back in the late forties. And it was invented because we were throwing a lot of real small particles of tobacco

away.
When you take -- When you receive a tobacco leaf, when you buy that from farmers through auction, there's actually a mid rib and then there's little stems that come out from that mid rib in the leaf.
To get the lamina or the leafy portion of that tobacco away from the stems, it goes through a process. That process will break some of the leafy portion of the tobacco into really small pieces of tobacco that are not -- that are not the right size

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to make into cigarette rods.
So this reconstituted tobacco process was developed so that we could take these small pieces of tobacco and turn them into larger pieces that we could then make cigarettes with, okay?
Q. Do you have a chart that shows how Reynolds makes reconstituted tobacco?
A. I do.
Q. Okay. Would that help you explain how the process works?
A. Yes.
MR. BELASIC:
Your Honor, could we put up DDA-000620?
EXAMINATION BY MR. BELASIC:
Q. And is this an illustration of the reconstituted tobacco sheet process at R. J. Reynolds?
A. Yes.
Q. Would it help you to explain it?
A. Yes, it would.
MR. BELASIC:

May we publish, Your Honor?
MR. BENCOMO:
No objection to the demonstrative, Your Honor.
THE COURT:
You may publish.
EXAMINATION BY MR. BELASIC:
Q. Doctor, can you tell us how this illustrates the reconstituted tobacco process?
A. Sure.
Again, the reconstituted tobacco process takes pieces of tobacco that are too small to use in cigarette manufacture. It also takes some of the stems that come out of the mid rib -- come away from the mid rib, so these small stems are also placed in a centrifuge.
Now, to that centrifuge is added a lot of water. The water extracts a lot of -- a lot of materials from the tobacco, flavors. Anything that is soluble in water will come out in that centrifuge, including nicotine, because nicotine is quite water soluble.
So the nicotine and tobacco solubles, water solubles, are then separated and taken to a tank. And the resulting pulp, which is a lot like, at that point, it's a lot like wood pulp -- it's mainly cellulose, pectin and lignin -- is then made into a paper sheet using normal papermaking technology.
We take the paper sheet of that pulp and then we reapply those water soluble materials, which includes flavors and nicotine, to that paper sheet. It then goes into a cutter, and it's cut to pieces

that are the right size for cigarette manufacturing.
Q. Doctor, why do you take out these water solubles? Why do it in the first place?
A. Well, it's pretty simple.

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The papermaking process involves a lot of water. And so if we didn't take the water solubles out first, we tried to make the paper sheet, the water would wash out those solubles and down the sewer. So we take them over to the side, hold them, and then reapply them to the paper sheet.
Q. Well, what would happen if all the water solubles were washed out down the sewer? What would happen to the resulting tobacco?
A. It really wouldn't smoke like tobacco or burn like tobacco. Because those water solubles contain a lot of flavorful compounds. It also includes nicotine. And reconstituted tobacco without extract -- that extract replied just does not taste the same.
Q. Would it be like smoking a sheet of paper?
A. Pretty much.
Q. Now, when you put the water solubles back in, are additional liquids or is nicotine added?
A. No, it is not.
Q. Does Reynolds ever add nicotine in this process?
A. No, we do not.
Q. Does this process have an effect on the amount of nicotine that's in tobacco?
A. Actually, it does have an effect. We lose some nicotine in this process. So if you look at the materials going into the process and you look

at the sheet, reconstituted sheet coming out, the nicotine level is less.
Q. Now, do you have any reconstituted tobacco with you here today for the jury to see?
A. Yes, I do.
Q. And I believe you've got two bags?
A. That's right.
Q. And what's the difference in the bags?
A. One is just the paper sheet without the water soluble extract reapplied. The other one has the water soluble extract applied.
MR. BELASIC:
I believe you have them up there.
Your Honor, we'd like to have Dr. Townsend be able to hold up first Demonstrative Exhibits AS-485 and AS-490, the bags of reconstituted tobacco.
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
You may hold them up.
THE WITNESS:
(Complies.)
EXAMINATION BY MR. BELASIC:
Q. And would you like to describe them? Or do you think it would be more helpful to your testimony if the jury could pass them around?
A. Well, it might be helpful, if Your Honor doesn't mind, for the jury to actually smell them or look at them, if you like.
THE COURT:
You may hand them to Mr. McCoy.

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THE BAILIFF:
You want both of them or just one?
THE WITNESS:
Both of them will be fine.
Just to explain, the darker color has the extract applied. The lighter color does not.

EXAMINATION BY MR. BELASIC:

Q. While the jury, Doctor, is passing this around, let me ask you a few more questions about reconstituted tobacco.

A. All right.

Q. Now, to be fair, wasn't the original purpose of reconstituted tobacco to save money because you could use more of the tobacco leaf?

A. We invented it originally to save money.

Q. But you subsequently found that it did have an effect on tar and nicotine?

A. What we found after we invented the process was it does reduce tar and nicotine because of the, in large part, because of the stems that are used in there. And when you burn that tobacco, it generates less tar and less nicotine.

Q. Okay. So less of both? Less tar and less nicotine?

A. That's correct.

Q. Now, in addition to reducing tar and nicotine, does reconstituted tobacco have any effect on the biological testing or biological activity of the tobacco?

A. It does.

And, in fact, after we invented the process,

we found -- and, also, the government through the National Cancer Institute study -- found that it had lower biological activity, that is, the tar from burning reconstituted tobacco had less mouse skin painting tumorigenicity, so it generated fewer tumors in a mouse skin painting test.

Q. Well, if reconstituted tobacco reduces tar and it reduces nicotine and it reduces tumors in these animal tests, why don't you just make all your cigarettes with a hundred percent reconstituted tobacco?

A. Well, actually, we've tried that. And a hundred percent reconstituted tobacco cigarettes just don't taste good. We can use them at -- We can use reconstituted tobacco at, well, I'd say 15 to 20 percent is typical in a blend. But if you go to a hundred percent, those cigarettes don't taste good.

Q. Now, when did Reynolds develop reconstituted tobacco?

A. The original process was in the late forties.

Q. And was it kept a secret from the scientific community?

A. No, it wasn't.

Q. Was it kept a secret from the general public?

A. No, it wasn't.

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Q. How was it made public?
A. Well, there were a number of ways, including our CEO, Bowman Gray, told Congress about it in -- I forget exactly the date -- but it was in the mid fifties, I believe.
Q. That's almost fifty years ago --
A. Yes.

Q. -- the head of R. J. Reynolds told Congress, "We're using this reconstituted tobacco in our cigarettes"?
A. That's right.
Q. And was the fact that reconstituted tobacco was in a cigarette, was that reported in the popular press?
A. Yes.
Q. Where, if you know?
A. Well, in Reader's Digest, among others.

MR. BELASIC:
You can take that demonstrative down, Bert. Thank you.

EXAMINATION BY MR. BELASIC:
Q. The next thing that you had on your original illustration of the general reduction techniques was expanded tobacco?
A. Yes.
Q. Can you tell us what expanded tobacco means?
A. Sure.

Expanded tobacco actually has as its basis the idea that if you burn less tobacco, when you burn a cigarette, you generate less tar and nicotine. So that's the idea behind it.

So expanded tobacco was invented by Reynolds in the mid sixties to -- it was invented by Reynolds in the mid sixties to essentially take tobacco and make it occupy a larger volume so that you could pack a tobacco rod, pack a cigarette, with it and have less weight of tobacco in the cigarette.

So we developed a process to expand tobacco and make it occupy a larger volume.

Q. So you puff up the tobacco?
A. A lot like popcorn, actually. You start off with something fairly small; and when it expands, it is larger.
Q. Now, was it successful? Was expanded tobacco successful in reducing the tar and nicotine yields of the cigarettes?
A. Yes, very successful.

In fact, it's one of the major cigarette design tools, along with filtration and air dilution, for reducing tar and nicotine.

Q. Now, do you have with you in the courtroom today some examples of regular tobacco versus expanded tobacco?
A. I do have those examples.

MR. BELASIC:
And, Your Honor, we have two jars of tobacco, demonstrative exhibits AIW-3595 and

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AIW-3596.
And, with your permission, we'd like Dr. Townsend to be able to comment and then have them passed around to the jury.
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
You may proceed.
THE WITNESS:
Okay. What I have here is two jars that have the same weight of tobacco in each jar. This is normal tobacco that's nonexpanded. We call it cut filler. It's been cut to the right size to make cigarettes with.

But this weight is the same as this weight, which is expanded tobacco. So we've taken the tobacco and put it through this process which makes it expand, again, a lot like popcorn. So you see it, obviously, fills a lot larger volume.
MR. BELASIC:
If we could pass it around to the jury, Your Honor.
EXAMINATION BY MR. BELASIC:
Q. While the jurors are looking, let me ask you some other questions.
Again, if expanded tobacco is so successful at reducing the tar and nicotine yields of cigarettes, why doesn't Reynolds just make all its cigarettes from expanded, reconstituted tobacco?
A. Well, we've tried making cigarettes out of a hundred percent expanded tobacco. We've actually tried making combinations of expanded and reconstituted tobacco. And all those products are not consumer acceptable.
Q. And when you say "not consumer acceptable," what do you mean?
A. I mean, --
MR. BENCOMO:
Your Honor, may we approach? Objection.
THE COURT:
You may approach.
MR. BENCOMO:
Thank you.
(Whereupon a bench conference is held at this time as follows:)

THE COURT:
Mr. Bencomo.
MR. BENCOMO:
Yes, Your Honor.
My objection is similar to that which I have been making and maintaining throughout. And it is the fact that he is not in the Marketing Department, he is not in the Consumer Department, he is a chemist in the Design and Research Department.
And I think that this is outside his

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field of expertise. He can't talk about -- He has never conducted any tests with the -- And I could go on and on, but I think Your Honor gets the drift of my objection.

MR. BELASIC:

Your Honor, that's absolutely untrue. He's in the Research & Development Department. What he does is he makes cigarettes for the marketplace. The R & D Department does all kinds of consumer focus groups and taste tests.

What he doesn't do in marketing is he doesn't do advertising. But he makes cigarettes for the marketplace. That's how he evaluates every cigarette. Will it sell? Do people buy it?

Now, I can ask questions to show his personal knowledge.

THE COURT:

He's not asking for an opinion; he's asking for a factual bit of testimony. And I

will instruct him to answer, if he's able to. I don't think it bears on his qualifications. If he knows the answer, I'll let him answer it.

MR. BENCOMO:

Okay. That's fine.

(Whereupon the bench conference is concluded at this time.)

THE COURT:

Objection overruled. Answer the question, if you're able to.

MR. BELASIC:

Could we have the question read back, Your Honor?

(Whereupon the preceding question was read back by the court reporter.)

THE WITNESS:

Thank you.

Clearly, the taste characteristics are so different that consumers will not buy those products. They don't like them. They don't like the taste characteristics.

EXAMINATION BY MR. BELASIC:

Q. Now, when you do your work at the Research & Development Department, you've talked about what the research is. Does the development refer to the fact that you're actually making these products to sell?

A. Development is the portion that defines what products we sell, yes.

Q. And the goal of your cigarette design is to make a cigarette that people will buy; correct?

A. Yes, without question.

Q. And when you talk about what types of cigarettes people like or what types of cigarettes smokers find acceptable, are you just making that up?

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A. No, this is very real.
Q. Okay. Do you have personal knowledge of the types of cigarettes that smokers find acceptable?
A. Yes, through experience either through consumer testing that's done or through experience in the marketplace.
Q. Now, when you talk about consumer testing, what type of consumer testing does the Reynolds R & D Department do?
A. Well, there are several different types of consumer testing of prototypes or products that we conduct. We can have internal expert panel evaluations. More often, though, we have outside, non-employees come in and participate in smoking panels where they judge the smoking qualities.
We also mail out, do large-scale mailout studies to hundreds of people where we send them two packs, usually two packs, for them to evaluate and comment on not only the smoking attributes but on the acceptability, their likelihood that they would purchase such a product and that sort of thing.
Q. So when you test market or when you -- not test market -- but when you test a product, you actually have people who are smokers come in and smoke a cigarette and tell you whether they think it tastes good?
A. In some cases, they come in and do that; in other cases, we mail products to their home and they

agree to participate in this panel. And there will be hundreds of subjects around the country. And we get -- send them the cigarettes, they evaluate them.
Q. Okay. And your judgment then of what makes a cigarette consumer acceptable is based, in part, on this actual, this empirical research with real smokers?
A. In part. I think looking at what doesn't work in the marketplace also is a measure.
Q. Okay. And by that, you mean just looking at whether it sells?
A. Yeah. For example, --
Q. Whether other people like it?
A. For example, marketing a cigarette with a hundred percent expanded tobacco has been done. And that's been largely rejected by consumers.
Q. Okay. Now, to what extent does Reynolds use expanded tobacco in the cigarettes it sells today?
A. Well, virtually all of our products have some level of expanded tobacco. The very low-tar cigarettes have more, can approach 50 percent for the very low-tar cigarettes; the lights products typically have 20, 25 percent of expanded tobacco.
Q. Now, is one of the reasons that the low-tar products do have lower tar yields that they use more of this expanded tobacco?
A. It's one of the very important reasons, yes.
Q. The next thing you had on your chart was filter ventilation, the air holes. And you referred to it as air dilution.
What is air dilution?
A. Air dilution is one of the very important tar

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reduction or general reduction techniques as well. And, essentially, it's putting holes in the filter, poking holes in the filter so that when the smoker draws on the cigarette, a portion of what goes in their mouth is actually fresh air that goes through those vents, through those holes in the filter.

It not only dilutes the smoke but it reduces how much air is coming through the front end of the cigarette near the fire cone, where the tobacco is burning, reduces the amount of air going through there, so it generates less tar as well because of that reduction in air volume.

Q. Now, when did these vent holes, this air dilution, first appear?

A. Well, I think they first started appearing in the fifties. I think there was -- Carlton was first marketed in the early sixties, about '64, thereabouts.

Q. And was the use of these vent holes for air dilution, was that a secret?

A. No, it wasn't a secret at all. It was in the marketplace.

Q. Was it reported in the popular press?

A. It was.

Q. Do you know where?

A. Well, including Reader's Digest, yes.

Q. Now, the jury has heard testimony about where the vent holes are placed. Can you tell us how Reynolds decides where to put these little holes on the filter?

A. Sure.

The FTC smoking method requires that the

cigarette be inserted into the machine 11 millimeters. So, obviously, the holes can't be shorter than 11 millimeters.

Q. Or what would happen?

A. Or you'd block the holes and it would not be as low a tar yield as the design would indicate.

So it's got to be more than 11 millimeters. The problem is the further you move those vent holes up toward the tobacco rod, the less effective they are and the less effective your filter is in removing smoke.

So there's got to be some compromise. And R. J. Reynolds has chosen 13 millimeters from the mouth end to place the vents because that's a good compromise. It's also right about the middle of the filter.

Q. And you talked about the insertion depth of the FTC test machine. All of us saw a video of the test machine. Do you mean that the cigarette is actually inserted in about 11 millimeters? That's what insertion depth is, how far it goes into the FTC smoking machine?

A. Well, not exactly.

Q. Okay.

A. It's inserted in there exactly 11

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millimeters.
Q. Okay.
A. I think you said "about." The method specifies it's exactly 11.
Q. You deliberately make it 13 millimeters so the holes will not be blocked when it's in that machine?

A. That's correct.
Q. Now, you've heard, of course, that consumers might block some of the holes with their finger or their mouth? You're familiar with that criticism?
A. I'm familiar with that.
Q. Did you take that into account when you designed where you'd put the air holes --
A. Yes.
Q. -- on your filters?
A. That has been taken into account.

In fact, we've conducted experiments looking at filters from smoked cigarettes, where people have smoked them in their normal everyday life, and evaluated whether or not they block the vents during that smoking.

And the result is that it can and does occur, but it doesn't occur very often. And very few percent of the butts, the spent butts that we examined, showed any evidence of blocking. So it can and does occur, but it's not a prevalent occurrence.

Q. Well, let's be real blunt.

At Reynolds, do you design those air holes so people will block them?

A. Absolutely not.
Q. Is there a way you can even do that?
A. Not that I know of as we sit here. I think, you know, you could probably come up with some way of doing it, if you wanted to. But I don't think so.
Q. Now, what if you took all the air holes and you moved them out to the farthest end of the

filter, as far away from the person's mouth as possible? Based on your experience, your training, can you tell us what effect that would have on smoke yields?
A. Well, again, if you put the filter ventilation holes all the way at the front end of the filter, right next to the tobacco rod, what that does is it reduces the filter efficiency of the filter itself. It also reduces the air dilution level. So both things will act together and you will not be able to design an ultra low tar cigarette very well with that.
Q. If someone makes the claim that the reason Reynolds or other companies put these vent holes in the filter is they're trying to cheat the machine, what's your response to that?
A. I think that's not true at all. Those vent holes, the way the cigarettes are designed, they do

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not cheat the FTC smoking method.
Q. Now, what would happen if Reynolds just got rid of all the vent holes so you didn't have the issue?
A. Well, if you didn't have air dilution or filter ventilation, it's going to be extremely difficult to develop consumer acceptable ultra low tar products, especially. It makes it more difficult to develop lights products but, especially, the ultra low tar products.
Q. And why is that?
A. Well, because air dilution is one of the key ways of reducing tar and nicotine level.
Q. Now, we talked about, I think, just about

each of the things you illustrated on your chart that showed the pictures of the general reduction. I want to talk about the effects over the years of these general reduction techniques that you've just discussed on Reynolds' cigarettes.
And let's take Winston for an example. You said Winston was introduced on the market when?
A. 1954.
Q. And since 1954, has Reynolds used these general reduction methods on a Winston?
A. Yes. We've not only used them, but we've improved them and modified them over the years.
Q. And is the Winston of 1954 different or the same as a Winston in 2003?
A. They're very different products.
Q. And have you prepared a chart that shows the effect of these design changes on the tar and nicotine yields of a Winston?
A. Yes, I have.
MR. BELASIC:
Okay. Your Honor, we'd like to put up DDA-000615, a demonstrative chart.
MR. BENCOMO:
No objection, Your Honor.
MR. BELASIC:
May we publish, Your Honor?
THE COURT:
You may publish.
EXAMINATION BY MR. BELASIC:
Q. Now, there's a lot of information on this chart. And could you start, Dr. Townsend, by telling the jury what the -- what each side

measures?
A. Sure.
On the left-hand side, you see the scale for tar yield per cigarette. So that's milligrams per cigarette of tar. And that represents -- is represented by the blue line or blue curve. On the right-hand side is the axis for nicotine yield. And that's represented by the red curve on the chart.
Q. And this chart covers from 1954 through 1998?
A. That's correct.
Q. Okay. Could you go through and tell the jury

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what the information on the actual chart itself means?

A. Sure.

In 1954, at the introduction of Winston, the tar yield was about 38 milligrams per cigarette. So a very high, high tar yield here at 38.

By 1956, we started figuring out ways to improve the filter, to make it more efficient. You'll see a pretty rapid drop in tar yield. We introduced longer filters in that period of time, introduced more porous cigarette papers to help dilute the smoke.

In 1963, we reduced the circumference of it, so you're burning less tobacco. We introduced air dilution in 1980. And you'll see the tar level for Winston red, Winston full flavor or the higher tar version of Winston has gone from 38 down to today or, actually in '98, of about 15. And today it is also about 15.

The nicotine, you'll see, has pretty much paralleled the tar reduction. Not exactly but very

close. And it's not exactly because some of these different general reduction techniques have a slightly different effect on tar than they do on nicotine.

Q. Why is that? Why would -- If tar and nicotine are both in the smoke and you're trying to reduce the amount of smoke that actually comes out, why would there be a different effect, even slightly different, on tar and nicotine?

A. Because trapping the tar, removing tar is largely by filtration, you know, the capture of those little liquid droplets that we talked about. Remember the streamlines and everything?

So you're trapping the tar particles; whereas, some compounds can be selectively absorbed by the filter material itself. And nicotine is one of those that can be somewhat selectively absorbed. So you have different removal efficiencies.

Q. Now, you make some products at Reynolds that don't have a filter; right?

A. Yes, we make a Camel without a filter.

Q. Why do you do that? Fifty years after inventing the filter, why would you sell a cigarette that doesn't even have a filter?

A. Well, there are a number of smokers that want that product, so we continue to sell that.

Q. Now, can you reduce tar and nicotine yields even in a cigarette that doesn't have a filter?

A. Yes, you can.

Q. And have you done it with the Camel?

A. We have.

Q. Can you describe what the total reduction has

been and how you've been able to do that?

A. Sure.

Even without a filter, because of these other design tools like, especially expanded tobacco, the

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use of higher levels of expanded tobacco, more porous papers, the reconstituted tobacco and then a few other techniques taken together has allowed us to reduce the tar yield from Camel nonfilter from about 38 milligrams down to about -- I think it's about 22 today.

MR. BELASIC:

You can take that down, Bert.

EXAMINATION BY MR. BELASIC:

Q. Now, of course, Reynolds sells cigarettes other than Winston and Camel; right?

A. Yes.

Q. Now, did the tar and nicotine yield of the other cigarettes that Reynolds manufactures change as well?

A. Yes, they've changed, also.

Q. And have you prepared a chart that shows the range of the tar and nicotine yields of the cigarettes that Reynolds sells?

A. I have.

MR. BELASIC:

Your Honor, we'd like to put up DDA-000621.

EXAMINATION BY MR. BELASIC:

Q. Can you tell us where the information in this chart comes from?

A. This comes from the FTC report.

Q. Okay. From the Federal Trade Commission

reports?

A. That's correct.

Q. Okay. And would this help you explain what the effect on the tar and nicotine yields has been of these techniques that you've discussed?

A. Yes, it would.

MR. BELASIC:

May we publish, Your Honor?

MR. BENCOMO:

No objection, Your Honor.

THE COURT:

You may publish it.

EXAMINATION BY MR. BELASIC:

Q. I see your graph covers a 30-year period from '55 to '86. So can you explain what this shows us?

A. I'd be glad to.

What I've got here, again, is tar yield in milligrams per cigarette versus time beginning in '55 to '86.

And you'll notice the blue line -- or I guess it's purple -- goes from about 50 milligrams per cigarette down to about 22, 23 milligrams per cigarette. And that curve represents the highest single cigarette that we sold at any point in time.

The lowest cigarette that Reynolds sold is represented by the red line. And you'll see in 1955 was nearly, well, about 38 milligrams and went down in 1986 to almost zero. In fact, there's some products that we've sold, like Now Box 83, has a level so low that it's really difficult to measure. They're almost zero.

So the point here is there's been a major

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reduction in the high -- the highest tar product that we sell, a major reduction in the lowest tar product that we sell. And the range, the range of tar levels offered to the consumer is larger than it used to be. And the highest -- this is very important -- the highest tar product we sell today is substantially lower than the lowest tar product we used to sell.

MR. BELASIC:

You can take that down, Bert.

EXAMINATION BY MR. BELASIC:

Q. Dr. Townsend, you said as part of your work you have to study your competitors' designs --

A. Yes.

Q. -- to keep abreast of what they're doing?

A. Yes, that's right.

Q. Have your competitors, Philip Morris, Lorillard, Brown & Williamson, have they used these general reduction techniques?

A. Yes, they have.

Q. And have you prepared a chart that shows us what the overall tar and nicotine levels for all the cigarettes sold in the United States have done?

A. Yes, I have prepared that.

MR. BELASIC:

Your Honor, we'd like to put up DDA-000622.

EXAMINATION BY MR. BELASIC:

Q. Can you tell us -- Can you tell the jury where the information in this chart comes from?

A. This, again, comes from the Federal Trade Commission tar and nicotine report. Also, it

includes data that's taken from the Maxwell Report, which is marketing -- I mean, I'm sorry, sales information from the marketplace.

Q. The Maxwell Report is what gives the national sales data for all the different tobacco companies?

A. For all the different not only companies but by brand.

Q. Okay. And it's what companies would look for to see how well their brands are doing and who's selling the most?

A. That's right.

Q. It's very important for your competition with the other companies?

A. It sure is.

MR. BELASIC:

Your Honor, may we publish?

MR. BENCOMO:

No objection, Your Honor.

THE COURT:

You may publish.

EXAMINATION BY MR. BELASIC:

Q. Again, can you describe what we're looking at here?

A. Sure.

On the left-hand side, again, we're looking

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at tar yield per cigarette; on the right-hand side, nicotine yield per cigarette as a function of time from 1954 to 1998. And you'll notice again -- And this is for the entire industry. This is the sales-weighted average tar level and the sales-weighted average nicotine level. What that means is that that really is the average tar yield in the

marketplace corrected for sales.

Half of the products, half of the total cigarettes sold at any point in time would be greater than that number and half would be less than that number, okay?

So the sales-weighted average has gone from 38 down to about 12 in 1998. And you'll notice that the nicotine has gone from about 2.6, 2.7, actually, down to about .9. So there's been a major reduction in both tar and nicotine on a sales-weighted average across the market. And that's all cigarettes sold in the market.

Q. Doctor, plaintiffs' witnesses have claimed that this type of reduction is an illusion. Is it?

A. I don't understand what you mean by "illusion." I disagree with that.

Q. Well, did you make up these figures?

A. No, these are real data. This is not made up.

Q. Have the tar and nicotine yields actually gone down?

A. The tar and nicotine yields in cigarettes in today's market have gone down by more than 60 percent over this period of time. In fact, nearly 70 percent.

Q. Well, has this data ever been used, say, by the Surgeon General?

A. Well, it's been used by the Surgeon General, yes.

Q. You've read the Surgeon General's reports?

A. Sure.

And there's a chart with similar data, in

fact, the same data, it's plotted a little differently, but it's in the Surgeon General's report.

Q. So even the Surgeon General would use the same data from the same source, the Federal Trade Commission?

A. He has, yes.

Q. Now, was it technology alone, was it just cigarette design that resulted in this decrease in tar and nicotine?

A. No, it wasn't the design alone. I mean, we at Reynolds can -- and my competitors -- can design cigarettes with lower tar yields and lower nicotine yields, but it also requires consumers to like those products and buy them. So I would say it's cigarette design and consumer acceptance together.

Q. So if everybody was still smoking unfiltered Camels or other unfiltered brands, the tar and

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nicotine yields would be much higher?
A. We would not have seen this reduction if consumers hadn't accepted lower tar products.
MR. BELASIC:
All right. We can take that exhibit down. Thank you.
EXAMINATION BY MR. BELASIC:
Q. We've talked about the effect now on tar and nicotine and other issues. I want to talk more about whether or not this decreased the risk.
You said you've been doing this for fifty years?
A. Yes.
Q. Okay. And has the public health community

been endorsing these types of techniques for fifty years?
A. Yes, they have.
Q. Was there ever -- Did there ever come a time when the Surgeon General himself looked at all these techniques that you've told the jury about and evaluated whether they reduced the risks?
A. Yes, he did. In the 1979 report, there was a good summary of that.
Q. Okay. And do you have a demonstrative exhibit that is taken from that 1979 report by the United States Surgeon General?
A. Yes.
MR. BELASIC:
Your Honor, could we put up DDA-000623?
MR. BENCOMO:
No objections to the demonstrative, Your Honor.
MR. BELASIC:
May we publish it?
THE COURT:
You may publish it.
EXAMINATION BY MR. BELASIC:
Q. Doctor, first, of course, we see the title, "Reduction of Biological Activity of Cigarette Smoke." And can you tell the jury what you mean by -- well, what is meant by "biological activity"?
A. Well, "biological activity" refers to certain types of biological tests. For example, in this particular Surgeon General's chart, he's referring to ciliotoxicity. That's one particular type of biological test that can be conducted in a

laboratory. And you can compare cigarette smokes from two different products and see if they're different.
Another biological test is carcinogenicity or tumor promoters. And all that really refers to is skin painting, so -- mouse skin painting, I'm sorry.
Q. Now, when you say "biological activity," is that a code word that's used in the tobacco industry or is it used by others as well?
A. No, I think it's used by scientists in any industry and the universities. "Biological

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activity" refers to some effect on some particular test that's a recognized biological test.
Q. And does the Surgeon General himself use the term "biological activity" when he talks about cigarette smoke?
A. Yes, he has.
Q. All right. If you could point out -- You see in the bottom right the source. And it says that this is taken from the 1979 Surgeon General's report?
A. That's correct.
Q. And it gives the exact page number?
A. Yes.
Q. See Page 14-114?
A. Yes, I see that.
Q. And then you'll see it says 0895. That's the plaintiffs' exhibit number?
A. Right.
Q. Is this chart verbatim from the Surgeon General's report?
A. Yes, it is.

MR. BELASIC:
Your Honor, I move to admit Exhibit DDA-000623 as a page of a 1979 Surgeon General's report that has already been admitted by the plaintiffs.
MR. BENCOMO:
Your Honor, if it's in evidence already, we don't have any objection.
THE COURT:
It's a portion of another exhibit, Mr. Belasic?
MR. BELASIC:
Yes, it's a portion of Exhibit 0895, the '79 Surgeon General's report, which was admitted by the plaintiffs the first day with Dr. Burns.
THE COURT:
Then it will be received in evidence.

EXAMINATION BY MR. BELASIC:
Q. Well, now, Doctor, I'll tell you we've actually tried to use this from the Surgeon General's report. But it was so blurry, we couldn't magnify it. I think this is a little better, I'm not sure.
Could you blow up the first section, Bert, the first four columns going across?
Do you think that's any bigger?
A. Marginally.
Q. Well, Doctor, can you do your best to tell us what these columns mean and what these pluses and minuses mean? What was the Surgeon General concluding here?

A. Sure.
It might be good if you'd get rid of that block, please.
Actually, what this does is the Surgeon

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General has summarized a number of cigarette design techniques and changes to cigarettes and then evaluated what does it do to tar, what does it do to nicotine, what does it do to biological activity? And that's what this chart is about.

So if we take, for example, tobacco processing, it's difficult to read, but let's go here to expanded -- I'm sorry, to reconstituted tobacco sheet. That's reconstituted tobacco like we've already talked about here today.

And the Surgeon General then evaluated what does it do to tar? And there's a little plus here for tar. And the footnote says that that plus means a significant reduction.

However, if we look at expanded tobacco and we go over to tar, there's two pluses. And the footnote for two pluses means it's more than a 50 percent reduction in tar as a result of that one single design variable.

Okay. The Surgeon General then goes across and says, okay, what's the change in nicotine? So for reconstituted tobacco, reduction in tar, reduction in nicotine, reduction in benzo(a)pyrene. Benzo(a)pyrene was, again, that polycyclic aromatic hydrocarbon that was thought to be related to lung cancer. And goes across. And for -- Yeah, it's hard for me to read.

Okay. And for expanded tobacco, you see two

pluses for tar, two pluses for nicotine, two pluses meaning a major reduction in benzo(a)pyrene.

And then for cigarette design --

Q. Dr. Townsend, I could give you a hard copy.

A. Okay. Well, I'm about finished.

Q. Okay.

A. We have paper porosity, perforated filters for air dilution. You notice air dilution has a major effect on tar and nicotine yield. Charcoal -- I'm sorry, cellulose acetate filter has a major effect. And then he looked at a number of other variables.

Q. Now, just to summarize, the Surgeon General looked at almost a dozen different types of design or other production techniques that could reduce tar and nicotine and other risks?

A. Yes.

Q. If you look at the "Tar" column, is it true that the Surgeon General found that every single one of these made a significant reduction in tar, that they all are rated plus or double plus?

A. All of the entries in this table have at least one plus. Two have a double plus: The paper sheet reconstituted process and the expanded tobacco.

Q. Okay.

A. And tobacco substitute, sorry.

Q. And for nicotine, isn't it true that the Surgeon General found that every single one of these techniques except one had at least a significant reduction in nicotine?

A. I see them all as plus, actually.

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Q. You see that only the cut of the tobacco was rated as a plus minus?
A. For nicotine?
Q. Yes.
A. This display shows the cut to be one plus.
Q. Okay. So for nicotine then, every technique?
A. Yes.

MR. BENCOMO:
Your Honor, may we approach?
THE COURT:
Yes.
(Whereupon a bench conference is held at this time as follows:)
MR. BENCOMO:
Judge, my objection is that either the witness -- and I'm not here to embarrass him -- either the witness has a different chart or there were two. And I don't want to go through this on cross, but both tar and nicotine both have what is called insignificant. And I think that Mark misstated it.
So why don't you correct that?
MR. BELASIC:
I agree and I'll go back and clear it up.
THE COURT:
Okay.
MR. BENCOMO:
Thank you.
(Whereupon the bench conference is concluded at this time.)

MR. BELASIC:
Your Honor, may I hand Dr. Townsend a hard copy?
THE COURT:
See if your microphone is on.

EXAMINATION BY MR. BELASIC:

Q. Dr. Townsend, Mr. Bencomo has eagle eyes. And he points out, if you'll look again in the "Tar" and "Nicotine" columns, do you see that for the cut of the tobacco, it says plus minus, which means it didn't really reduce tar?
A. I see that, yes. That's exactly right.
Q. Okay. And do you see that every other technique that the Surgeon General looked at significantly decreased tar?
A. Yes.
Q. And every other technique that the Surgeon General looked at significantly decreased nicotine?
A. That's right.
Q. Okay. Now, I know we've talked about that this was the conclusion of the Surgeon General himself. Do you know where the Surgeon General got the information from?
A. Yes. The Surgeon General actually got the information in this chart from the National Cancer

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Institute Tobacco Working Program.
Q. Okay. I think we've only referred to that once or twice in this case. Can you tell us what the National Cancer Institute Tobacco Working Group is?
A. Actually, the National -- Yes. The National Cancer Institute in, I think it was, 1968 put

together a scientific working group to figure out how to design cigarettes that are less hazardous. And the whole program was entitled "Toward Less Hazardous Cigarettes."

That effort included the scientific panel called the Tobacco Working Group, which included scientists from the government, from the public health community, from universities and from the tobacco industry.

And all the scientists came together, evaluated a number of cigarette design modifications and evaluated what their effects on tar and nicotine yield was. They also looked at some more detailed chemistry and tried to correlate, if they could, the detailed chemistry with some of the biology. So that was the Tobacco Working Group program. It lasted about ten years.

MR. BELASIC:

Bert, you can take that demonstrative down.

EXAMINATION BY MR. BELASIC:
Q. Going back to where you started, the National Cancer Institute, of course, is the federal government's cancer agency?
A. Yes, it is.
Q. So it was the federal government that started this group; correct?
A. That's correct.
Q. And did the federal government order the companies to participate or did it ask the companies if they would be willing to participate?
A. Well, the government asked the tobacco

companies to participate. And, of course, we gladly did.
Q. And did only Reynolds participate or did Brown & Williamson and Philip Morris and Lorillard participate as well?
A. All four companies participated.
Q. Okay. Now, you could have told the tobacco companies -- I mean, the tobacco companies could have told the government "No way, stay out of our business"; correct?
A. Well, that's possible.

But, certainly, from my point of view, Reynolds was eager and working hard to develop tools, design modifications that could reduce risk. I think we saw this as an opportunity to work with other scientists and with the government to make progress.
Q. Now, you cooperated with the federal

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government?
A. Reynolds -- Well, not me myself but Reynolds, the scientists from Reynolds did, yes.
Q. And the other defendants did as well, scientists from them?
A. Yes, that's right.
Q. Did the government cooperate with the tobacco companies throughout the course of that program?
A. Yes, they did.
Q. Now, why did it shut down, if you know?
A. Well, in the late seventies, about '78, thereabouts, the government decided that trying to design and make safer cigarettes was not really its agenda. Trying to get people to quit was the most

important agenda for the U. S. Government.
And, in fact, efforts to try to reduce risks of cigarettes in a way got -- interfered with the government's new agenda of smoking cessation. So the government did close the NCITWG program.
Q. Okay. They shut down all the research?
A. They shut down that whole program.
I think there was a, you know, some final reports that needed to be written but there was no more work done.
Q. Did the companies -- Well, did R. J. Reynolds continue doing the research that the government abandoned?
A. We continued doing risk reduction research without question.
Q. All right. You said that the National Cancer Institute Tobacco Working Group looked at various alternative cigarette designs. Do you have any idea how many different designs for a possibly safer cigarette they looked at?
A. There was well over a hundred that was evaluated. Many of these designs were ideas that came from -- Actually, most of these ideas came from scientists in the industry or they were already in place in the marketplace. And so NCITWG evaluated the effectiveness of these, looked at the chemistry, what the biological activity was, tried to draw correlations, as I said, and draw conclusions.
Q. Was one of the specific goals of this National Cancer Institute Tobacco Working Group to actually make a safer cigarette?
A. Absolutely.

Q. Now, when you say safer cigarette or decreased risk, can you tell the jury what you mean? And then we'll talk about what others might mean.
A. To me --
Q. What do you mean by a safer cigarette first?
A. To me, a safer cigarette is one that is less likely to cause disease. That means if you look at -- if you were to do an epidemiology study, you would find a lower relative risk of that disease. For example, lung cancer. So a safer cigarette is less likely to cause cancer in a smoker.

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Q. And when you talk about a safer cigarette, do you mean the cigarette is safe, that it's a safe cigarette?
A. Absolutely not. There is no safe cigarette. I think any cigarette, even these modified cigarettes, the very low-tar cigarettes, always carry substantial risk. There is no safe cigarette.
Q. Do you know of any way that you can set tobacco on fire and inhale it without having some risk of disease?
A. I don't know of any way to do that.
Q. Now, did the government give a definition, when it started the National Cancer Institute Tobacco Working Group, of what a safer cigarette would be?
A. Not really.
I think implied was, you know, some reduction in biological activity coupled with plausible chemistry reductions. But it was very unclear and I don't think the government really did.
Q. Well, even today, does the government have a

definition, some standard, that you can measure your work against to know if you've made a safer cigarette?
A. No, it doesn't.
And I wish the government did or the scientific community did develop such a standard. It would make our job much easier. We've developed our own standard, frankly.
Q. How would it make your job easier?
A. Because it -- the targets would be clear and scientists in the public health community and universities would be working with us because the goals are very clear and established.
Q. Okay. Now, you said you have your own criteria for attempting to determine what is a safer cigarette. I assume that you don't make an experimental cigarette and then get a whole bunch of people to smoke it and follow them after fifty years and see if they get cancer?
A. No, we don't.
Q. That's not something that you could do or that you would do; correct?
A. No, that's correct.
Q. So how do you measure and attempt to make the decision as to whether your design is a safer cigarette?
A. Let me take just one example.
If, let's say, we have a prototype that we think might be safer, we go through a number of very detailed, very rigorous evaluations. And one is to look at the chemical reductions in great detail, to look at hundreds and hundreds of compounds that are

in smoke and try to understand have we reduced compounds that might reduce risks?
Then we turn to biology, both in vitro studies and in vivo studies, laboratory studies and

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animal studies, and try to determine is there a significant change in reduction in those biological measures?

Then we look at humans and we try to evaluate -- we try to find certain changes, perhaps in their respiratory tract, in their lungs, in their blood, that's consistent with the chemistry and the biology reductions. And should lead or should represent a reduction in disease risk.

And then, finally, the fourth step is to get independent scientific review of all of our data to, hopefully, come to a conclusion that, yes, this product represents reduced risk.

Q. Now, in the National Cancer Institute Tobacco Working Group, those ten years that it was in existence, did the government researchers themselves come up with any of the ideas and say, "Why don't the tobacco companies test this product"?

A. No, I don't think they did.

Q. Okay. Who came up with all the ideas?

A. I think scientists in the tobacco industry came up with those ideas.

Q. And did the government -- did the government researchers that were part of the National Cancer Institute Tobacco Working Group approve the research into those areas?

A. Oh, absolutely.

Q. Okay. So the research in that decade at

least, and you said it was -- what? -- '68 to '78?

A. I think that's right, yes.

Q. So the research on safer cigarettes during that decade then wasn't secret from the government; correct?

A. No, it wasn't secret at all. The government was participating in this whole effort.

Q. It was being done hand-in-hand with the government?

A. That's correct.

Q. Now, as someone with 25 years of experience in the field of cigarette design and someone that the National Cancer Institute has asked to be on one of its expert committees, looking back on the experience of the NCI Tobacco Working Group, what do you think you learned or you draw from the effort?

A. Well, a couple things: The first and probably the most important is that the cigarette design modifications that were in the market and some that were implemented into the market subsequent to this were important, they were major factors in reducing the overall tar/nicotine yields, they were major factors in reduced risk, and they had some biology reductions that -- These were headed in the right direction.

The second reaction to the whole thing is I'm terribly disappointed that the NCITWG was abandoned because I think if the government had stuck with it and we had continued to push toward a safer cigarette, I think we would be much, much further along today.

MR. BELASIC:

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Could we put DDA-00623 up again?
Your Honor, that's the same Surgeon General's chart that was just admitted.
May we publish?
THE COURT:
Yes.

EXAMINATION BY MR. BELASIC:

Q. I wanted to ask you one last question about this. These were the conclusions of the Surgeon General; correct?

A. Yes.

Q. Has the Surgeon General in the twenty years since refuted these conclusions, said, "No, we were wrong. These methods didn't decrease the risk"?

A. No, I don't think the Surgeon General said that.

Q. When you talked about the biological tests, carcinogenicity, tumorigenicity, looking at the animal studies, has the Surgeon General refuted its conclusions on those tests and said, "No, they weren't safer"?

A. No, I don't think so at all.

Q. So this finding of the Surgeon General still stands today in 2003?

A. Yes.

Q. Are you proud of the work you did?

A. Yes, very much.

MR. BELASIC:
Could you take that down, Bert?

EXAMINATION BY MR. BELASIC:

Q. When did the idea that it would be a good idea to reduce tar and nicotine levels or tar levels

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in cigarettes first gain widespread acceptance?

A. Well, it was certainly in the fifties. I think one of the tenets of toxicology is that less ought to be better. And in the fifties when the first mouse skin painting studies were -- successful mouse skin painting studies were published and the first significant epidemiological studies were published, I think the growing awareness of the risks of smoking became prevalent and led to calls for tar reduction. Less ought to be better.

Q. You mentioned the mouse skin painting studies. The jury has been told about Dr. Ernst Wynder. Do you know who he is?

A. Yes.

Q. And he was one of the pioneers in mouse skin painting studies?

A. Yes, he was.

Q. Did Dr. Ernst Wynder give any advice to tobacco companies on what they should do about tar and nicotine levels?

A. Well, Professor Wynder actually spent most of his life looking at the issue of the risks of smoking. And he did, in 1957, essentially recommended that tobacco companies produce cigarettes with at least a 40 percent reduction in

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tar level.
Q. And has the industry done that?
A. Well, as we've seen in the earlier exhibit, there's been more than a 60 percent, in fact, close to a 70 percent reduction in tar level.
Q. Now, was Dr. Ernst Wynder the only voice out there that was calling on tobacco companies to

figure out ways to reduce tar and nicotine?
A. No. The public health community, scientists in the public health community and the government certainly were all calling for that.
Q. Based on your review of the literature, can you give the jury some examples of the public health community that were calling for reductions in tar and nicotine?
A. Well, sure.
And, in fact, one of the most notable is the Surgeon General. And the Surgeon General evaluated tar reduction. And, for example, in the 1981 Surgeon General's report, he said that tar reduction was very important and, in fact, probably had reduced the risks of smoking. So the Surgeon General believes that that really was a significant step.
Scientists at the Banbury Conference, which is a conference where a number of prominent scientists like Professor Wynder, Dr. Hoffmann, a number of others, Fred Bach, came together to evaluate whether it's possible to build safer cigarettes, they also believed that general reduction was essentially the way to go, that it had been successful, that it had made some progress in risk reduction.
Q. Now, along the way, did the Surgeon General or the public health community make any helpful improvements in the design of cigarettes themselves that would meet that goal?
A. No, I don't know that they did. I think they developed a number of theories; that tobacco company

scientists evaluated all those theories, and tried to determine what we could do in cigarette design to reduce risks.
Q. When the Surgeon General made that chart of conclusions about the dozen different ways to reduce tar and nicotine, were any of them invented by the Surgeon General or the public health community?
A. No.
Q. Did all of them come from the tobacco industry?
A. Yes.
Q. And the Surgeon General found that they decreased tar and nicotine and decreased biological activity?
A. Yes.
Q. You mentioned briefly when you were talking about tar and nicotine about Reynolds' ultra ultra low tar cigarettes. What's the lowest brand --

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What's the lowest tar measurement you have of any brand that Reynolds sells?
A. That we sell currently today, it's about one milligram per cigarette. We had a product on the market called Now Box, 83 millimeter in length, which had extremely low levels. In fact, it was so low that you almost couldn't measure it. Much less than one milligram. That product, unfortunately, there weren't enough smokers that wanted to buy it, so we'd finally taken it off the market.
Q. And how do you know there weren't enough smokers to buy it?
A. Because we didn't have to make cigarettes and ship them. There were a few out in retail, and they

just stayed there.
Q. All right. Now, if you're trying to make a safer cigarette, and the smoker won't smoke it, smoke something else, can you meet your goal?
A. No.
To meet your goal, to really reduce risks, to have an impact on the smoking and health issue, you must develop consumer acceptable products. You haven't done anything useful if smokers don't buy them.
Q. I want to switch topics.
You talked about general reduction. We've gone through all those various techniques. But you also had on your chart what you called selective reduction. And could you tell the jury just briefly again what selective reduction was and we'll talk about just a few examples?
A. Sure.
Selective reduction is another approach to reducing risk but it's based on the idea that there's one compound or a group of compounds, a class of compounds, that is the problem; that is, it's that class that is responsible for the development of whatever disease you're talking about.
So the idea is to go in and remove or reduce the levels of those compounds in smoke, keeping everything else the same, just selectively targeting those particular compounds.
Q. Now, is it harder or is it easier to zero in on a specific chemical in this complex smoke mixture and take that out without affecting anything else?

A. Well, it's much harder to accomplish selective reduction without affecting, in particular, taste. If you take -- If you compare general reduction, reducing the total tar level down, you don't change the taste character. You change the intensity of the taste, how strong it tastes and everything. But the taste signature or the taste character is really not substantially changed.
But, now, if I go after selective reduction and go in and take out a particular group of

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compounds, many of the ways to accomplish that do substantially affect the character of the taste.
Q. You said you were familiar with the testimony of the plaintiffs' witness, Dr. William Farone?
A. Yes, I'm aware of some of it, yes.
Q. Okay. And he listed some compounds that he said should be reduced. Do you remember that?
A. Yes.
MR. BELASIC:
If I might ask again if the plaintiffs could put up Dr. Farone's exhibit, WF-6.
Thank you, Carl.
Your Honor, this is a demonstrative exhibit that was used by the plaintiffs with Dr. Farone.
May we publish?
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
You may publish.
EXAMINATION BY MR. BELASIC:

Q. You see here, Dr. Townsend, that Dr. Farone, his term, he called these the "PRIME SUSPECTS." And I'd like to go through these. And if you could tell us what, if anything, R. J. Reynolds has done about it.
A. Okay.
Q. First, he listed nitrosamines. Can you tell us what nitrosamines are?
A. Sure.
Nitrosamines are a class of compounds where nitric oxide can react or nitrate composition products can react with amines. They form this class of compounds called nitrosamines. They are very reactive compounds. And many people think they may be related to cancer formation.
Q. Now, are they only in cigarette smoke?
A. No.
Actually, nitrosamines are in a lot of different consumer goods, including bacon and beer, leather products. They're pretty -- They're pretty much everywhere.
Q. Did you say in beer?
A. I'm sorry?
Q. Did you say in beer?
A. Yeah, beer, bacon. Any cured products, most cured products contain nitrosamines.
Now, there's nitrosamines that are specific to tobacco. They're called tobacco-specific nitrosamines. And they're reaction products with nicotine, that's why they're specific to tobacco. Nicotine plus nitric oxide forms these new compounds that are thought to be related to cancer.

Q. Now, were researchers at Reynolds aware of nitrosamines and the belief that they were linked to cancer?
A. Yes, of course.

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Q. What did Reynolds do about it?
A. Well, we actually conducted quite a lot of research to try to figure out how they're formed in tobacco. We developed test methodology so that we could analyze them at very low levels.

And in the course of the work in trying to figure out how they're formed in tobacco, we pretty much discovered that they're formed during the curing process. If you take tobacco out of the field when it's green, not cured, there's no tobacco-specific nitrosamines in the tobacco.

If the farmer then puts the tobacco in a curing barn and then heat -- begins the heating process to dry the tobacco and cure it, then nitrosamines are formed.

So what we did was we developed a different type or, actually, discovered that using a different type of heating system would actually reduce nitrosamine formation by more than 90 percent.
Q. And once you found that a different type of -- Well, first of all, tell us how could a heating system really have that much of an effect on nitrosamines.
A. Well, the way farmers, the way the farmers in the United States were curing tobacco is -- and part of this is to try to save energy costs -- they'd take a barn, fill it full of tobacco, and then they had a propane burner fed usually by natural gas. So

this natural gas burner would heat up the barn; and the flue gas, all the combustion gases from the burner would go directly in the barn.

What we found out was in those combustion gases from the burner, there's a lot of nitric oxide. And so the nitric oxide in the gas inside the barn would then react with nicotine in the tobacco leaf and form these nitrosamines.

What we then did was come back and say, "Okay, these curing barns need to be refitted with a heat exchanger barn." And a heat exchanger is a lot like a radiator in a car so that you can -- you have a natural gas burner, and the hot gases from that burner go through pipes, and then from the pipes radiate out and heat the barn, but the combustion gases themselves never really go directly in the barn.

So the nitric oxide then doesn't go in the barn, you don't form nitrosamines. And, in fact, we saw more than a -- in fact, it was more than about a 93 percent reduction in tobacco-specific nitrosamines.
Q. Now, did Reynolds come up with this discovery on its own?
A. Yes, we did.
Q. It wasn't a government researcher who found this?
A. No, that's correct.
Q. It wasn't anyone in the public health community or the Surgeon General's office?
A. No. It was the results of our research.
Q. It wasn't any of the plaintiffs' experts that

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have published in the field?
A. No.
Q. What did Reynolds do? Did you keep the information secret?
A. No, we didn't.
In fact, the first thing we did was we invited scientists from our major competitor companies to our location where we discovered this and did the field studies, showed them all of our data, and suggested to them that they actually work with us to implement this major change among farmers across the growing regions in the United States.
The second thing we did was prepare scientific papers that were presented at CORESTA, the Tobacco Science Research Conference and, also, a press release.
The third thing we did was we made it clear that we were going to change and buy only tobacco produced by this heat exchanger method, and that all of the cigarettes we make would contain flue-cured tobacco made with that heat exchange process.
Q. All right. If you're in competition with everyone, why would you make a big discovery like this public? Why wouldn't you just hoard it for yourselves?
A. I don't think that -- Well, first of all, the main reason is reducing that one class of compounds, I don't think, could ever get us to a cigarette that we could -- that we could prove was a safer cigarette and we wouldn't get a competitive advantage.
However, the fact that we knew we could

reduce it but we couldn't really get a competitive advantage, we still felt an obligation to implement it. Because less ought to be better, reducing nitrosamines ought to be better, even if you can't prove that it will reduce risks. And we felt like the whole industry ought to make this change.
MR. BELASIC:
If you could take that down for a moment, Bert, and put up AN-000741.
EXAMINATION BY MR. BELASIC:
Q. Doctor, if you can see that, can you identify -- tell the jury what this document is?
A. Yes, this is a press release from Reynolds about the discovery on tobacco-specific nitrosamines.
Q. And this was Reynolds' press release about the method you found to reduce these tobacco-specific nitrosamines; correct?
A. That's correct.
Q. And was this a Reynolds business record that was prepared in the ordinary course of Reynolds' business?
A. Yes.
Q. And it's maintained by -- And I see it's maintained on Reynolds' website?

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A. It is.
MR. BELASIC:
Your Honor, move to admit as a business record Exhibit AN-000741.
MR. BENCOMO:
No objection, Your Honor.
THE COURT:

It will be received in evidence.
MR. BELASIC:
Could we put up Exhibit AN-000853?
EXAMINATION BY MR. BELASIC:
Q. And, Doctor, if you can see this clearly enough, is this a second press release about Reynolds' announcement of its intentions to use flue-cured tobacco with these reduced tobacco-specific nitrosamines?
A. This is a press release that speaks to Reynolds converting all of its products to low nitrosamine tobacco.
Q. And it's from December of '99?
A. That's correct.
MR. BELASIC:
Your Honor, move to admit Exhibit AN-000853 as a business record.
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
It will be received in evidence.
MR. BELASIC:
If you could put up, Carl, if you could put WF, I guess it was 6, back -- I'm losing my place, I'm sorry -- we could look at Mr. Farone's list again and go back to what was next on it.
EXAMINATION BY MR. BELASIC:
Q. Dr. Farone listed aldehydes as his second prime suspect. Were Reynolds' researchers aware of aldehydes?
A. Yes, there are a number of aldehydes in

cigarette smoke. Particularly aldehydes of most particular interest are in the gas phase, the vapor phase aldehydes. So we're not only aware of it; we've developed analytical methods to measure these aldehydes in smoke.
Q. What are they? What are aldehydes?
A. Well, it's a class of compounds that has what we call a carbonyl group. It's a carbon double bonded to an oxygen and a hydrogen, usually. So it's a class of compounds that can be somewhat irritating. And it's thought that irritation formaldehydes can lead to, in some cases, formation of tumors.
Q. Now, having known about aldehydes, did Reynolds do anything about it?
A. Of course.
The first thing we did, as I said, was develop a way to measure these aldehydes in smoke.

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We determined the levels of a bunch of aldehydes in smoke. And then we set about ways to selectively reduce those aldehydes.

And it included trying to use certain filter additives that would selectively remove the gas phase materials, looking at different types of tobacco treatments, additives to tobacco. Air dilution, of course, we found will reduce aldehydes considerably.

But back even in the sixties, we looked at aldehydes and found that the use of carbon in filters can selectively remove many of these low molecular weight aldehydes that are very irritating.

Q. Did Reynolds ever make a carbon filter

cigarette?

A. Yes, we did. It was called Tempo.

Q. And what happened?

A. Well, it failed in the market eventually. I think carbon filtered cigarettes were very popular in the U.S. back in the early to mid fifties -- I'm sorry, early to mid sixties. And they became very popular. They were a couple percent of the market. Tareyton, Lark, Tempo, all the major companies had one. And they were fairly popular there for awhile but then gradually tailed off to where they were an insignificant market share.

Q. And do you know why they failed in the marketplace?

A. Yeah, my opinion is that they failed because --

MR. BENCOMO:
Your Honor, may we approach? Objection.

THE COURT:
Approach the bench.

MR. BENCOMO:
Thank you, Your Honor.

THE COURT:
Ladies and gentlemen, we're going to take our mid-afternoon recess at this time until 2:30 by the wall clock.

(Whereupon the jury is excused at this time.)

THE COURT:
Let the record reflect the jury has left the courtroom.

I'll now entertain objections by

plaintiffs.

MR. BENCOMO:
Yes, Your Honor.

My objection is -- goes to the fact that, again, this individual is not a marketing expert. And he continues to talk about marketing issues and why something failed in the marketplace.

And to the extent that he is going to give an opinion on something besides taste, I just think it's beyond the scope of his

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expertise.
THE COURT:
Response?
MR. BELASIC:
Your Honor, he's qualified as an expert on cigarette design and cigarette performance. I went through his personal knowledge and the research he's done, both the consumer research groups that Reynolds has done on taste, on consumer acceptability. He's talked about his access to the market data. This guy knows why these cigarettes have failed.
And if Mr. Bencomo thinks he doesn't know enough, then the solution is cross-examination. But he's qualified as the Executive Vice-President in charge of developing these cigarettes to give an opinion on whether they worked.
MR. BENCOMO:
Judge, if I may just add a very brief

point.
THE COURT:
I think it's outside his area of expertise.
MR. BENCOMO:
Thank you.
THE COURT:
And his answer began, before Mr. Bencomo objected, "Yeah, my opinion is that they failed because...." That's expert opinion.
Objection sustained. I will instruct the --
MR. BENCOMO:
Thank you, Your Honor.
THE COURT:
Anything else for the record?
MR. BENCOMO:
Yes, Your Honor.
I was made aware of the fact that Volume I of the 1979 Surgeon General's report was in evidence as Exhibit 0895. The chart that Mr. Belasic referred to from the '79 report is not in evidence. And that is Exhibit 0896.
But I don't have any objection. I just wanted to clear the record on that point.
MR. BELASIC:
Thank you. I appreciate that. I don't quite understand it, but I appreciate it.
MR. BENCOMO:
It was broken up into two exhibits. That was the problem.
MR. BELASIC:

All right. That was the Surgeon General's report that was so big that it was two exhibits.
MS. DeSUE:

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It was two exhibits.
MR. BELASIC:
Okay.
THE COURT:
Anything by defense counsel?
MR. SCHNEIDER:
No, Your Honor.
MR. LONG:
Yes, Your Honor.
THE COURT:
Mr. Long?
MR. LONG:
For the record, based on my observations, it appears to me that during this afternoon's proceedings, both Juror Number 1, Mr. Forman, and Juror Number 10 appeared to me to be sleeping during a portion of the proceeding.
THE COURT:
Well, I check them from time to time, Mr. Long. But sometimes I have to look at the lawyers and sometimes I have to look at the screen.
MR. LONG:
I understand.
THE COURT:
When I notice that it seems that one of them is not mobile in any sense of the word,

I send a message to a juror to tap them on the shoulder. And I'll continue to do that. To the extent I'm able to inspect the jurors' posture and movements and rule on the testimony and the objections.
Thank you.
MR. BENCOMO:
Your Honor, just to also amplify that for the record, due to the nature of the cross-examination of this witness and the fact that I myself found this as somewhat laborious testimony, I did nothing but look at the jurors and never saw what Mr. Long has just referred to. As a matter of fact, I found them to be totally alert.
THE COURT:
Anything else for the record?
MR. LONG:
Yes, I have something for the record.
It's pretty easy to say something for the record. But Mr. Bencomo was right in my line of sight, and I could see what he was looking at when I was looking at the jurors. For the record, he was not looking at the jurors when I was looking at the jurors.
MR. RUSS HERMAN:
Would you please instruct Mr. Long not to signal the jurors?
(Whereupon a brief recess was taken at this time from 2:19 o'clock p.m. to 2:35 o'clock p.m.)
(Whereupon the jury joins the

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proceedings at this time.)
THE COURT:
Please be seated. Recess is over.
Mr. Belasic?
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, do you have personal knowledge of whether any manufacturer of cigarettes sells a charcoal filtered cigarette in the United States today?
A. Yes, I do.
Q. And who does?
A. Brown & Williamson sells -- Actually, Liggett & Myers sells Lark; and Brown & Williamson sells Tareyton, I believe.
Q. Okay. Do you have personal knowledge of what their market share is, how well they sell?
A. Both of them are minuscule market share. I'd say they're almost immeasurable.
Q. Now, you mentioned that Reynolds reduced aldehydes in other ways without using charcoal filters?
A. Yes. In general reduction techniques, especially through air dilution and also expanded tobacco.
Q. And was Reynolds successful in these techniques?
A. Yes, very much.
MR. BELASIC:
If we could put up, Carl, again, WF-6, Dr. Farone's list of "PRIME SUSPECTS."
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, do you see that the third prime

suspect is what Mr. Bencomo asked you about, the polynuclear aromatic hydrocarbons, the PAHs?
A. Right.
Q. Now, did Reynolds make efforts to reduce the amount of PAHs that were in cigarette smoke?
A. Yes, quite extensive efforts going back to the fifties.
Q. Have you prepared a chart that shows the various methods by which Reynolds attempted to reduce some of these PAHs?
A. Yes, I have.
MR. BELASIC:
We could take that down, Carl. Thank you.
Bert, could you put up DDA-000633?
EXAMINATION BY MR. BELASIC:
Q. And is this a chart that you prepared about the major techniques that Reynolds investigated to reduce BaP and some of the other PAHs?
A. Yes, it is.
Q. And would it help you in explaining Reynolds' work in trying to reduce those compounds?
A. Yes.
MR. BELASIC:
Your Honor, may we publish?

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MR. BENCOMO:
No objection, Your Honor.
THE COURT:
You may publish.
EXAMINATION BY MR. BELASIC:
Q. Could you review for us these major techniques that were explored?

Before you do, first of all, is BaP the benzo(a)pyrene that you talked about?
A. BaP is benzo(a)pyrene. And it is just, you know, one of the numerous polycyclic aromatic hydrocarbons that are present in smoke.
Q. Could you go through and summarize then what this chart tells us about the efforts that Reynolds made to reduce BaP?
A. Sure.
This chart does summarize the efforts. And I've broken it into categories. For example, trying to prevent the formation of benzo(a)pyrene as the tobacco is burned by the use of tobacco additives.
See, tobacco does not contain these polycyclic aromatic hydrocarbons. They are products of combustion. So the concept is to add something to tobacco that would prevent their formation during combustion.
The second approach is once it's formed in smoke through that combustion, somehow try to selectively filter benzo(a)pyrene by using different filter materials or different filter additives even.
The third approach, again, is to prevent its formation by using different cigarette papers. Cigarette papers that are much more porous, that allow more air to come in, and would interrupt the production of benzo(a)pyrene in the combustion.
And then, finally, trying to remove the precursors, that is, the compounds that, when burned, ultimately form benzo(a)pyrene and other PAHs through tobacco extraction.
Reynolds has looked at all four of these

different approaches, looked at many different additives, many different selective filtration materials, different cigarette papers. And, in fact, found tobacco extraction to be technically possible by extracting those precursors, we have seen a reduction in benzo(a)pyrene through that extraction process.
Q. Did the other methods that you investigated work?
A. No, not really. The others were pretty much failures.
Q. Nonetheless, has Reynolds been able to reduce the amount of BaP that's present in its cigarette smoke?
A. We have, but not through tobacco extraction. We spent quite a lot of effort evaluating this and trying to get this to a commercial process. And we found a number of products -- problems with tobacco

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extraction to reduce benzo(a)pyrene.
What we ultimately have done is through the use of general reduction, we've seen a major reduction in benzo(a)pyrene and other PAHs through general tar reduction.
Q. Now, the next item on Dr. Farone's list of "PRIME SUSPECTS" was metals. And he said it included something called radioisotopes. What does that have to do with cigarette smoke?
A. There is -- There is a radioisotope that is a metal. Well, it's a metal that's a radioisotope. And is actually common in the air and ultimately can land on tobacco as well as other agricultural products. So very, very low levels of a certain

isotope called polonium can be present in cigarettes at extremely low levels under some conditions.
Q. Has Reynolds been able to identify any metals in cigarette smoke?
A. Yes, we've -- In fact, we've developed a number of analytical techniques that's found a number of metals, like cadmium, for example, and we've investigated ways to reduce or eliminate those. And in every case for metals, especially, the most effective way has been general reduction.
Q. Okay. Not selective reduction, some magic bullet that would remove just that chemical?
A. That's correct.
Q. So did you respond then to the presence of what Dr. Farone called a prime suspect --
A. Yes.
Q. -- metals and radioisotopes?
A. These and others.
Q. And you responded by reducing them?
A. Yes.
MR. BELASIC:
We can take that down, Bert.
Finally, if we could look at the last item on Demonstrative WF-6.
And if we could put that up one more time, Carl, I'd appreciate it.

EXAMINATION BY MR. BELASIC:

Q. See, we're right at the end of Dr. Farone's list, he talks about carbon monoxide and NOx. Can you tell us what NOx is?
A. That's nitric oxides or nitrogen oxides.
Q. Now, did Reynolds take steps and conduct

research investigation to be able to reduce carbon monoxide and NOx in its cigarettes?
A. We have.
And most of that work has filtered on -- has focused on selective filtration, putting some kind of catalyst or absorbent in the filter that might remove these compounds. Another way has been to use tobacco additives to try to prevent their formation. And there's been very little practical results out of that.
And one -- one general reduction technique,

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and that's filtered air dilution or ventilation, does have a significant effect on carbon monoxide and nitrogen oxides. So ventilation can and does reduce carbon monoxide and nitrogen oxides.
Q. Is it fair to say then that for each of the prime suspects that plaintiffs' witness, Dr. Farone, listed, Reynolds can and has taken steps to reduce those in its cigarettes?
A. Yes.
Q. And do you know if Reynolds' competitors have taken similar steps to reduce them?
A. Yes, they have.
Q. All of them? All three of the competitors here?
A. All of the major tobacco companies, including my three competitors.
Q. Okay. And so are levels of nitrosamines, aldehydes, PAHs, metals, carbon monoxide, are they lower in cigarettes today than they were back in the fifties before all this research began?
A. Yes.

Q. Do you consider that a success?
A. Yes, I do. Very much.
MR. BELASIC:
Thank you, Carl. We can take that down.
EXAMINATION BY MR. BELASIC:
Q. Now, earlier on when you gave us the list of the ways that Reynolds looked at to reduce the risks of smoking, you talked about something called the tar-to-nicotine ratio. And, particularly, you talked about reducing the tar-to-nicotine ratio.
We haven't heard about that in this case for about a month. Can you tell us what the tar-to-nicotine ratio is and what reducing it would mean?
A. Sure.
The tar-to-nicotine ratio is, really, it's the ratio of how much tar is delivered by the cigarette relative to how much nicotine is delivered by the cigarette. So reducing the tar-to-nicotine ratio -- sometimes I call it the T:N ratio -- reducing that ratio means you've got less tar per unit or per milligram of nicotine.
Q. Now, if you have less tar per unit of nicotine, that means you could hold tar constant and increase the nicotine?
A. You could hold tar constant and somehow increase the nicotine, yes.
Q. Or you could reduce tar but not reduce the nicotine as much?
A. Or you could hold tar level -- I mean, I'm sorry, hold nicotine level and reduce the tar as much as you can.
Q. Now, why have people in the field of

cigarette design even been interested in such a thing?
A. Well, actually, it's been the area -- an area of intense research interest among scientists inside

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and outside the tobacco industry. And the reason is because most people believe that cigarette smoking is a risk because of compounds that are in the tar or delivered with the tar yield phase -- the tar phase. And so if the risk is present, the compounds that cause risk are present in the tar, then it makes sense to reduce that as much as possible.

Now, people also believe that nicotine is a very important reason why people smoke. It's not the only reason that people smoke, I believe, but it's a very important reason. And to maintain consumer acceptance of the products, if you keep the nicotine level about where it is now and reduce the tar, that probably is a safer cigarette. That's the scientists' theories.

Q. Now, when you were -- when you're doing your cigarette design work, and you've looked at this area, have you reviewed what people in the public health community said about reducing the tar-to-nicotine ratio?

A. Yes, of course.

Q. And did some of these people in the public health community recommend that you make a low-tar cigarette that had higher amounts of nicotine?

A. Yes, they did.

Q. Did some of them even recommend adding nicotine to low-tar cigarettes?

A. Of course they did, yes.

Q. And some of the witnesses in this case for plaintiffs have said that we should do that; haven't they?

A. In this case?

Q. Yes.

A. I don't know what all the witnesses have said in this case.

Q. Are you familiar with Dr. Farone's suggestion that we increase nicotine in cigarettes?

A. He did in that case, I'm aware of that.

Q. And at the same time you know that Drs. Henningfield and Benowitz said just the opposite, reduce nicotine?

A. Dr. Henningfield and Dr. Benowitz have both published calling for lowering nicotine.

Q. Well, as part of your research and your review of the literature on the tar-to-nicotine ratio, can you tell the jury who the leading voices were out there saying that you ought to have a lower tar, higher nicotine cigarette?

A. Sure.

Well, certainly, the lead voice, in my opinion, is the Surgeon General. He considered that as a reasonable approach to possibly reducing the risks.

Also, in fact, one of the pioneers of this was a Professor Mike Russell who lives in London and is a professor there. And he was one of the original proposers of this theory and even today continues to be a proponent of it.

Dr. Gori, Gio Gori, who was Director at the National Cancer Institute and, in fact, was the

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leader of the NCI Tobacco Working Group effort toward a safer cigarette, he was a proponent of it and continues today to be a proponent of that approach.

There are others as well.

Q. Now, you mentioned the Surgeon General and Gio Gori at the National Cancer Institute. Are you really telling this jury that it was the United States Government that was proposing that you add nicotine to low-tar cigarettes to reduce the tar-to-nicotine ratio?

A. Certainly, scientists within the government were proposing that, yes.

Q. Including the Surgeon General?

A. Including the Surgeon General.

MR. BELASIC:

Could we call up Exhibit AZS-000933?

And, Your Honor, this document was previously admitted into evidence with Dr. Henningfield.

Oh, I'm sorry. 000993. Thank you, Jason.

EXAMINATION BY MR. BELASIC:

Q. Do you see the document now, Dr. Townsend?

A. Yes, I do.

MR. BELASIC:

Your Honor, may we publish? It's been previously admitted.

MR. BENCOMO:

No objection, Your Honor.

THE COURT:

You may publish it.

MR. BELASIC:

Could I hand Dr. Townsend a hard copy, Your Honor?

THE COURT:

Yes.

EXAMINATION BY MR. BELASIC:

Q. Do you see, Dr. Townsend, that this says "National Cancer Institute, Smoking and Health Program"?

A. That's right.

Q. All right. And it's the minutes of a meeting, description summary of a meeting that was held on May 5, '76?

A. That's correct.

Q. Do you see that the attendees at this National Cancer Institute meeting, the people who were there, are listed?

A. Right.

Q. Okay. And Dr. Gio Gori, who you said ran this program for the National Cancer Institute, he's the first one listed?

A. That's right.

Q. And then do you see that there are people from the tobacco companies listed?

A. I do.

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Q. And you agree that, according to this government document, Dr. Tom Osdene of Philip Morris attended, Dr. Spears from Lorillard attended and Dr. Senkus from your company, R. J. Reynolds Tobacco Company, attended?
A. That's right.
Q. Now, you know who those men were; right?

A. Of course.
Q. And who were they? What positions did they hold at their companies?
A. They were heads of their respective research organizations.
Q. Now, did you know Dr. Senkus?
A. Yes.
Q. When he was the head of R & D at R. J. Reynolds?
A. I knew him right after he was the head of R & D, yes.
Q. Okay. And did you know Dr. Spears when he was head of R & D at Lorillard or afterward?
A. Yeah, I knew Dr. Spears very well.
Q. Was he a good scientist?
A. He was an excellent scientist, yes.
Q. And he died about two years ago; is that right?
A. He did.
Q. Okay. So the only way we could hear from Dr. Spears in this case is if we had a deposition we could play?
A. I would assume.
MR. BELASIC:
Okay. If you could move to the second page and put that up on the screen, please.
May we publish that, Your Honor?
THE COURT:
You may publish it.
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, can you tell us what it says the purpose of this meeting by the government's

National Cancer Institute was?
A. Sure.
It says, under "PURPOSE OF MEETING," "Dr. Gori asked the consultants to consider the feasibility of producing a cigarette yielding a tar/nicotine ratio below 10."
Q. Now, are you familiar with this document and what it describes that the participants at this government meeting said that they were going to research?
A. Yes.
Q. Now, it describes a variety of ways that you could lower tar while keeping nicotine higher, relatively higher; correct?
A. That's correct. There are several ways.
Q. And, for example, according to this government meeting, the attendees were told that they should look at different ways to increase

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nicotine delivery through high nicotine tobaccos?
A. That's correct. Growing nicotine -- I'm sorry, growing tobaccos that have very high nicotine levels.
Q. Or to somehow modify tobacco sheet to have higher contents of nicotine?
A. That's correct.
Q. Or to use the reconstituted tobacco process to have higher amounts of nicotine?
A. Right.
Q. If you could look at the top of Page 2, Dr. Townsend --
A. Right.
Q. -- do you see that it talks about developing

a high-nicotine, high-tar tobacco, the very first sentence?
A. Yes. Dr. Tso talked about that from the U.S. Department of Agriculture.
Q. And Dr. Tso worked for, again, the United States Government --
A. That's right.
Q. -- correct?
A. That's correct.
Q. Now, this meeting was held -- what? -- 27 years ago?
A. Yes.
Q. As part of your work on cigarette design, you're familiar with criticism of attempts to change the relative ratio of tar and nicotine in cigarettes; correct?
A. Yes, I am.
Q. You've heard claims that this is nicotine manipulation; correct?
A. I have.
Q. And you've heard claims that that's somehow a bad thing?
A. Yes.
Q. Isn't what the United States Government meeting was proposing here simply ways of nicotine manipulation?
A. It's clear that what was discussed in this -- in these meeting minutes is nicotine manipulation. They were talking about using high-nicotine tobaccos, even adding nicotine to cigarettes through processing, for example, through the reconstituted tobacco process, all in an attempt to develop a

safer cigarette.
Q. And this was done under the auspices of the federal government's own National Cancer Institute --
A. That's right.
Q. -- right?
Because they thought it would make a safer cigarette?
A. That's right.
Q. Okay. Do you think it's fair for 25 years later for witnesses to come into court and say that

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this is some sort of improper manipulation?
MR. BENCOMO:
Objection, Your Honor. May we approach?
MR. BELASIC:
I'll withdraw the question, Your Honor.
MR. BENCOMO:
My objection is that it was argumentative.
THE COURT:
Do you wish to approach, Mr. Bencomo?
MR. BENCOMO:
No, Your Honor.
THE COURT:
The next question, please.
MR. BELASIC:
We can take that document down.
EXAMINATION BY MR. BELASIC:
Q. Now, did R. J. Reynolds conduct the research that the National Cancer Institute Tobacco Working Group suggested it should do?
A. We did.

We've conducted research with high-nicotine tobaccos, we've conducted research with adding nicotine to prototype cigarettes to try to develop low tar-to-nicotine ratio products.
Q. Well, aren't you researching ways to manipulate nicotine then? Is that what you're telling the jury?
A. Yes, basically.
Q. And have you been able to use in commercial cigarettes any of this research?
A. Not in commercial cigarettes, no. Those approaches have not been used commercially.
Q. Are you still investigating?
A. We are. We have a project looking at that as we speak.
Q. Have you done -- Why haven't you put them into actual cigarettes that are sold in the marketplace?
A. So far, we've not been able to make a consumer acceptable cigarette with a very low tar-to-nicotine ratio. We've looked at a number of ways to try to change that, to make it more consumer acceptable. And, in fact, that's the direction we're trying to take.
Q. Now, when it comes to the public health people that now criticize these events as nicotine manipulation, or the opinion of the National Cancer Institute Tobacco Working Group that it should be researched, which suggestion is R. J. Reynolds following today?
A. We're following the approach that it should be researched. And we're doing that.

Q. And why are you doing that?
A. In an attempt to make a safer cigarette.
MR. BELASIC:
Bert, could we call up Plaintiffs'

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Exhibit 5193?
Your Honor, this has been admitted into evidence. It's one of the plaintiffs' exhibits.
May we publish it?
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
You may publish.
MR. BELASIC:
Just one second.

EXAMINATION BY MR. BELASIC:

Q. Dr. Townsend, do you see that this document stamped "RJR CONFIDENTIAL" is titled "Research Planning Memorandum on the Nature of the Tobacco Business and the Crucial Role of Nicotine Therein"?

A. Yes.

Q. And you know this was written by Dr. Claude Teague?

A. I do.

Q. You've read this document?

A. I have.

Q. More than a few times?

A. Yes.

Q. And you knew Dr. Claude Teague?

A. I did know Dr. Teague.

Q. Well, you know him now; right?

A. I did know him actually then.

Q. And he worked for R. J. Reynolds, overlapped during the period that you worked for them?

A. Yes, we both worked at Reynolds for this one period.

Q. All right. I'd like to ask you some questions about this document.

You understand that the plaintiffs have used this document in this case?

A. Okay. I understand.

Q. All right. First of all, it says "RJR CONFIDENTIAL" on it. Why would it have that kind of stamp on it? Was that unusual?

A. No, in fact, that's very common. All of our documents are essentially confidential, all the Reynolds research and development documents. The information we develop is -- we want to keep from our competitors.

Q. Okay. And is that the reason? The proprietary interests?

A. Yes.

Q. Now, can information that is in a confidential document, nonetheless, be published in those publications that you were talking about that Reynolds' scientists made?

A. Yes, absolutely.

Q. Okay. But do you typically publish, for example, cigarette design research that says what you're looking at for different products?

A. No, because that's highly confidential. That's highly proprietary.

Q. Now, let's look at what Dr. Teague wrote.

But, first, I want to ask you what Dr. Teague

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did for R. J. Reynolds during the period that he wrote this document. This was 1972.
A. Dr. Teague, I believe, in '72 was Director of Planning for Research & Development. He would, in fact, you know, generate some ideas; he would help organize the department to get people in Research & Development to develop R & D plans accordingly and --
Q. Now, was he ever in charge of product development?
A. No.
Q. Did he ever set policy for the types of cigarettes that R. J. Reynolds would make?
A. No, never.
Q. Was he in charge of nicotine research?
A. No.
Q. Did he ever set any policy as to what type of nicotine research you ought to do at R. J. Reynolds?
A. No, he didn't.
Q. Well, based on your 25 years there, is it fair to say that Claude Teague was not influential in the design of Reynolds' cigarettes?
A. He was not influential in the design of cigarettes.
Q. Now, when you talk about planning, was his role mainly administrative?
A. It was an administrative job.
Q. Well, when we say "administrative," what types of things was Dr. Teague doing?
A. Well, a number of things, including, you know, any -- any project plans, project monitoring, I think, went through Dr. Teague. He sort of was

the administrator of the project management type efforts within the department.
Subsequently, he was also responsible for the facility, the R & D facility itself, and the administration of that.
Q. Well, when you say he was responsible for the facility, you mean he was responsible for the research work that went on or he was responsible for the building?
A. No, he was responsible for the building or the buildings that we have.
Q. So if you wanted to get a new office, you'd go to Dr. Teague?
A. Basically, yes.
Q. And if you wanted to argue about what could be included in the budget, you'd go to Dr. Teague?
A. For facility, yes.
Q. But if you wanted to decide what nicotine research you would do, would you go to Dr. Teague?
A. No.
Q. And if Dr. Teague said, "I've got a good idea, we should do this type of research," does that mean it would get done?
A. No.
Dr. Teague, in fact, a number of times said,

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"I've got some ideas, here's what I think we ought to do." And I'm not aware of any of it that was done.

MR. BELASIC:

If we could turn to Page 3, please.

May we publish, Your Honor?

THE COURT:

You may publish.

MR. BELASIC:

And could you highlight the portion we talked about, Bert, down at the bottom?

EXAMINATION BY MR. BELASIC:

Q. Dr. Townsend, can you see that well enough or do you need a hard copy?

A. I think I can see that.

Q. Okay.

All right. You're familiar with this statement, aren't you, that Dr. Teague wrote in this memo?

A. Yes.

Q. And I can tell you that the jury has been read this many times.

First of all, do you agree with what Dr. Teague is saying here?

A. No, I don't agree with this.

Q. Okay. He says that "If nicotine is the sine qua non --" First of all, what does that mean?

A. Well, I'm not a Latin scholar. But I would translate that, without which nothing, meaning that's essential.

Q. So he basically means that nicotine is the essential part of tobacco products --

A. Yes.

Q. -- as you read it?

It says, "If nicotine is the sine qua non of tobacco products and tobacco products are recognized as being attractive dosage forms of nicotine," he says it's logical to design the products around nicotine delivery.

A. Yes.

Q. Do you know if this was distributed to people in the Reynolds R & D Department?

A. I don't -- I don't know what the extent of the distribution of this document was.

Q. Okay. Now, starting in 1972, did Reynolds start designing all their cigarettes around nicotine delivery because Dr. Teague, the administrator, thought that they should do it?

A. Of course not. We did not do that.

Q. Now, you joined in '77, so you were there about five years later.

A. Yes.

Q. When you arrived as a research chemist, was Reynolds designing its cigarette products around nicotine?

A. No.

Q. Was Reynolds doing the kind of research

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projects that Dr. Teague suggested in this document?
A. In this document? No.
Q. Has, in the 25 years that you've been there, has Reynolds followed what Dr. Teague was talking about here?
A. No.
Q. Have they done the types of research that Dr. Teague is talking about here?
A. In this document?
Q. Yes.
A. No.
MR. BELASIC:
If we could move to the next page, Your Honor, may we publish Page 4?

THE COURT:
You may publish it.
MR. BELASIC:
And could we highlight the sentence in the first paragraph, Bert, and blow it up?
EXAMINATION BY MR. BELASIC:
Q. Do you see here that Claude Teague suggested that Reynolds' products should deliver about 1.3 milligrams of nicotine? And he said that was a crude target dosage level for the design of new products.
A. Right.
Q. As someone who's worked in the design of new products for 25 years, is that the way Reynolds designs its new products? With a target level of nicotine?
A. No, we don't design to a target nicotine level.
Q. Well, what do you design to?
A. We design to a particular tar level, which would put it in a category of full flavor, lights or ultra lights or even lowest. But tar is a target design criterion. Taste characteristics can be design criteria, but nicotine is not.
Q. Now, are you telling the jury that Reynolds doesn't care how much nicotine is in the cigarettes they sell?
A. No, of course not.
It turns out that in practice for a given tar level, the nicotine level has to be within a certain fairly narrow range to be consumer acceptable. And if the nicotine level is too high, then those

products are too harsh, too strong, too irritating. If the nicotine is too low, those products are judged too weak, too mild and just not consumer acceptable.
So it is important. It's just that we don't use nicotine design targets.
Q. Now, is it unusual for someone at Reynolds to write a memo and say we ought to do this and then it doesn't get done?
A. No, that's not unusual at all. It happens a lot.

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Q. Have you read thousands of memos in the 25 years you've been at R. J. Reynolds?
A. Altogether, certainly, I've read thousands.
Q. And it would be fair to say that lots of ideas never get acted upon?
A. That's right. Lots, lots never get acted on; many do.
Q. And are you telling this jury that, based on your personal knowledge, this was one of the ones that was not acted on?
A. That's correct.
Q. Well, let's follow up on that.
Do you see that what Dr. Teague was saying is you ought to make a cigarette that had a target nicotine level of 1.3 milligrams? Is that the typical nicotine dosage for -- nicotine yield for Reynolds today?
A. No, it's not. Not today. I think it was about the time Dr. Teague was writing this memo. That was, I think, typically the average in the marketplace.

Today, the average, the sales-weighted average, in fact, we saw from an earlier chart today is about somewhere between .8 and .9 milligrams per cigarette.
Q. So if you were designing your cigarettes to follow Dr. Teague's 30-year-old memo, you sort of overshot and reduced nicotine way too much; right?
A. That's possible.
Q. Well, just by the way, how does Dr. Teague's suggestion compare to what we've just seen from the National Cancer Institute and what you said the Surgeon General was saying?
A. Dr. Teague's suggesting that nicotine is actually, in his opinion, the reason people smoke; and, therefore, targeting a particular nicotine level that's consumer acceptable, and he suggested 1.3, and then reducing tar is essentially down the same path or similar path.
The difference -- The difference, in my opinion, is that Dr. Teague sees nicotine as the sine qua non, the only reason people smoke. And even suggested we design products around it and even advertise around it.
Q. As the person who's in charge of designing cigarettes at R. J. Reynolds, do you agree that that's the reason people smoke? Nicotine?
A. I think nicotine is a very important reason that people smoke, but it's not the only reason.
Q. Okay.
A. Cigarettes without nicotine are not consumer acceptable. Nicotine is very important, but it's not the only reason people smoke.

MR. BELASIC:
Okay. And you can take that down, Bert.
Thank you.
EXAMINATION BY MR. BELASIC:

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Q. Well, we've talked about general reduction, we've talked about selective reduction, we've talked about changing the tar-to-nicotine ratio. And of the different ways that you talked about decreasing risk, the last one was tobacco heated.

What do you mean when you tell the jury tobacco heating?

A. Well, actually, tobacco heating is an idea we had at Reynolds and did considerable research. And the idea is that when tobacco burns, a large number of chemical compounds are formed, many of which are thought to be related to cancer and other diseases.

The idea was can we invent, develop a cigarette that did not burn tobacco and generate as many compounds in the combustion process? So can we develop and invent a cigarette, for example, that only heats tobacco?

And the idea, the concept, is if we heat tobacco and out of the mouth end of the cigarette, you're not burning the tobacco, so out of the mouth end of the cigarette, some smoke that results from that heating can carry some flavors, carry some nicotine, and if it's consumer acceptable, might be a very good cigarette that shows major reductions in risk because the chemistry should be simpler.

And if that's the case, then hopefully the biology would be simpler and there would be a risk reduction.

Q. Well, did you, in fact, develop what you called a very good cigarette along those lines?

A. Yes.

Q. And what was the name of that cigarette?

A. The name of that cigarette was Premier.

Q. And wasn't the Premier cigarette the one that Mr. Bencomo was talking about with his Black Hole Program, what he called the Black Hole Program?

MR. BENCOMO:
Objection, Your Honor. May we approach?
THE COURT:
You may approach.
(Whereupon a bench conference is held at this time as follows:)
THE COURT:
Mr. Bencomo.
MR. BENCOMO:
Yes, Your Honor.
My only objection is that counsel continues to mischaracterize the testimony. I asked this witness if the name of their project was the Black Hole Project.
Now, he just put it on me that that's what I named it. That's not me. So I would ask that he rephrase the question to reflect that that was their project, not mine.
MR. BELASIC:
Well, that's not what I meant to say.
MR. BENCOMO:
Well, he knows what he meant.
THE COURT:
You can withdraw it and rephrase it. If

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he did give it the name and he objects to it, make it clear.

MR. BENCOMO:

Thank you, Your Honor.

(Whereupon the bench conference is concluded at this time.)

EXAMINATION BY MR. BELASIC:

Q. Let me rephrase, Dr. Townsend. Mr. Bencomo asked you some questions about this Black Hole Program?

A. Yes.

Q. Did that involve a particular type of cigarette?

A. Yes.

Q. Did that involve Premier?

A. Yes.

Q. And you explained it was called black hole because it was so secret that you didn't want the companies that compete against you to know what type of cigarette you were making?

A. Yes.

Q. And that's not unusual in your business?

A. Not at all.

Q. That's not unusual in any competitive business; is it?

A. That's right.

Q. Okay. Let's talk about the Premier program then.

First of all, how long did it take R. J. Reynolds to develop the Premier cigarette?

A. We started development of Premier in about 1981. And we test marketed it in 19 -- in the fall

of 1988.

Q. So eight years?

A. Approximately.

Q. And was that a significant effort?

A. It was a major effort. It's the largest development effort I've ever seen at Reynolds.

Q. A lot of people worked on it?

A. A lot of people, a lot of effort, yes.

Q. Now, what were the design goals when you started developing Premier?

A. Actually, there were three very important design goals or targets. The first is a major reduction in chemistry in the smoke from the cigarette.

The second was a major reduction in biology or biological activity in the smoke from the cigarette.

And the third was to reduce environmental tobacco smoke.

Q. Okay. Well, I'm not going to ask you about environmental smoke. That's not relevant here. Let's talk about the first two.

When you say reduce smoke chemistry, what do you mean? Doesn't all smoke have chemicals in it?

A. All smoke has actually a large number of

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chemicals in it. And the idea with Premier was by only heating tobacco, and not burning it, to reduce the amount of each of the compounds greatly; to substantially reduce and, if possible, to eliminate some of those, as many as possible.
Q. Well, how would heating tobacco instead of burning it affect smoke chemistry?

A. Well, because if you heat tobacco, you can -- you can, through that heat, drive some compounds off, particularly the more volatile compounds that tend to be more flavorful, actually, and more aromatic.
But when you burn tobacco, you generate new compounds, like benzo(a)pyrene, one of the compounds we talked about, that's not present in tobacco but comes only about when you burn the tobacco. So reducing some of those compounds is entirely possible through heating rather than burning.
Q. And you've talked about biological activity. How would heating tobacco instead of burning it, setting it on fire and inhaling it, how would that affect biological activity?
A. Well, if you were successful and reduced chemistry, and you reduced the chemistry a lot, you would see -- you would expect to see reduced biological activity. Because the biological activity is a direct result of that combination of chemicals that's present in smoke.
Q. Okay. Now, did Reynolds meet these design objectives, reducing smoke chemistry, reducing the biological activity in smoke?
A. Yes, we did.
Q. Did Reynolds publish any research on Premier explaining how you did what you did with Premier?
A. We published a lot of research in the peer-reviewed literature, we published -- presented papers at scientific meetings and we published a monograph that compiled all of our scientific studies on Premier.

Q. So, first of all, there's peer-reviewed literature out there that anybody can go out, any scientist can look at, that talks about Premier?
A. Yes.
Q. And it was reviewed by independent scientists in this peer-reviewed process?
A. Yes.
Q. All right. Then you talked about the monograph. Let me show you -- this is too big to put on the screen effectively -- but let me show you Exhibit AS-000359.
MR. BELASIC:
Your Honor, may I hand the witness a copy of this book?
THE COURT:
Yes.
EXAMINATION BY MR. BELASIC:
Q. Can you identify that for us, Dr. Townsend?

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A. (Witness reviews document.) Sure. This is the Premier monograph.
Q. And it was published when?
A. It was published in 1988.
Q. And was this published in the ordinary course of Reynolds' business as you developed this new cigarette?
A. Yes.
Q. Okay. It's been retained for your records?
A. Yes.
Q. Was it written by people that had firsthand knowledge of the project and the research that is described herein?
A. Yes, it was.

MR. BELASIC:
Your Honor, I move to admit Exhibit AS-000359 as a business record.
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
It will be received in evidence.

EXAMINATION BY MR. BELASIC:
Q. How many pages is the monograph, Doctor, about?
A. Well, it's quite thick. I don't recall. About 745 pages or thereabouts.
Q. Okay. Why did Reynolds publish over 700 pages of research on this new Premier cigarette?
A. Because, number one, we conducted a lot of research. The results to us suggested we had been successful in meeting our design criteria of simpler chemistry and reduced biology.
And we felt it was important for the scientific community to see everything we did, including details about the design as well as the evaluation.
Q. Okay. And by publishing it, did you make it possible for people in the scientific community to see everything you did?
A. Yes.
Q. And to see the results?
A. Yes.
Q. And to judge it for themselves?
A. Yes.
Q. Now, when you published this monograph, you talked about also publishing research in the peer-

reviewed journals; is that right?
A. Right.
Q. Did you have any peer review, any independent outside scientists review the 700 pages of research in this document?
A. We did. We had a review panel that went through everything in this monograph and conducted a peer review.
Q. If you could look, Doctor, at Page, it's Roman numeral XIII, XIII --
A. Right.

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Q. -- is that where the list of the scientists who acted as peer reviewers to check Reynolds' research begins?
A. That's where it begins, yes.
Q. And about how many of these independent scientists reviewed this research?
A. There was about thirteen, twelve or thirteen.
Q. All right. And were they from leading institutions?
A. They were. They were scientists from leading universities and organizations.
Q. Anybody particularly famous on that list?
A. Well, I think many of them are famous in their areas of specialty; in fact, most of them.
Q. Well, I'll point one out. Who is Dr. Dietrich Hoffmann?
A. Dietrich Hoffmann was a scientist that spent essentially his entire career studying smoke chemistry and understanding cigarettes and driving for safer cigarettes. He was at the American Health Foundation.

Q. And Dr. Dietrich Hoffmann worked with Ernst Wynder; correct?
A. He did.
Q. And Ernst Wynder is widely considered one of the giants in smoking and health research?
A. Yes. The two of them worked together essentially throughout their careers.
Q. And is Dr. Hoffmann considered to be one of the leading researchers in that field?
A. He is, indeed.
Q. In fact, didn't Dr. Hoffmann succeed -- he followed Ernst Wynder as the head of this American Health Foundation and their research center?
A. Yes.
Q. All right. Now, so these weren't tobacco company employees that were peer reviewers?
A. No, these were scientists from universities from outside the Reynolds' Research & Development who independently reviewed all of the work in this manuscript.
Q. Okay. How did you get these independent scientists to come and be willing to give all their time to review 700 pages of research and everything behind it?
A. Well, we paid them for their time, certainly. But as they reviewed this, they objectively reviewed for scientific merit everything in this -- in this document.
Q. And did you ultimately ask this independent peer-review panel to give its comments on whether you met your design goals with this new Premier cigarette?

A. That was one of the questions to this panel.
Q. If you could turn to Page IX and X, Roman numeral IX and X.
And can you read to the jury, beginning with

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the stated objectives of the development, what the peer review panel concluded?
A. Sure.
"The stated objectives of the development, as set forth in the monograph and emphasized in the oral presentations, can be summarized as follows: To simplify the chemical composition of mainstream and sidestream smoke emitted by the new cigarette; to minimize the biological activity of the mainstream and sidestream smoke emitted by the new cigarette...."
Q. All right. The next part talks about secondhand smoke, and it's not fair.
So not only did Reynolds believe that it met its goals but the peer review committee also believed that it met its goal to reduce smoke chemistry and to reduce biological activity?
A. Yeah, and I think that's clear in the next sentence where it says, "The committee considered these objectives to be commendable and concluded that they have been substantially achieved through the research and development program as represented by the information presented to the committee for review."
Q. We've talked about the research you published, whether you met your goals. We haven't even talked about what this cigarette was like.
A. Right.

Q. So let's discuss that.
A. Okay.
Q. Now, did you create an exhibit that could assist you describing to the jury the different parts of the Premier cigarette?
A. I did.
MR. BELASIC:
Could we put up DDA-000625, please?
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
You may publish it.
MR. BELASIC:
Well, I think this is the tar comparison, Doctor. It doesn't look like a drawing of Premier to me.
You can take that down, Bert.
(Whereupon a discussion was held off the record.)
EXAMINATION BY MR. BELASIC:
Q. Doctor, first, could you identify is that a drawing you had done to describe the Premier cigarette?
A. Yes, it is a drawing cutaway of the Premier cigarette.
Q. And is it an accurate depiction of what this new type of cigarette looks like?
A. That's right.
Q. Would it help you in explaining it to the jury?
A. It sure would.
MR. BELASIC:

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May we publish it, Your Honor?
THE COURT:
You may publish it.
EXAMINATION BY MR. BELASIC:
Q. Using this illustration, could you explain to the jury the different parts of the Premier cigarette that R. J. Reynolds developed?
A. Sure. Be glad to.

This is actually a very different cigarette than any other cigarette that you've seen. First of all, the cigarette is in two parts: There's a front end or a smoke production end; there's a back end or a mouth end that is a filtration and a flavor end.

Let me start with the front end. The front end, as we said, only heats tobacco; it does not burn tobacco. So in the very front end, we have a small piece of carbon that's a very high purity carbon, it's formed into a cylinder that has a certain pattern of holes in it, and that becomes the heat source. That's the only part of the cigarette that burns is this carbon heat source.

Around the heat source is a glass-mat insulator because the carbon, the burning carbon gets very hot, so the glass-mat insulator provides insulation around it. The carbon heat source is actually fitted into a substrate container. It's an aluminum -- an aluminum piece that, as you can see, is elongated.

And inside that aluminum piece is a substrate which is alumina beads, they're little pellets. And on the surface of the pellets is tobacco materials. And they're packed inside this aluminum can, this

aluminum container. Now, outside the aluminum container is what we call a tobacco roll. It's tobacco materials that are wrapped around the container. And the whole thing is wrapped with a cigarette paper.

On the mouth end of the cigarette, we have a tobacco paper filter very similar to reconstituted tobacco, contains a lot of materials that are very, very flavorful. And then a very low efficiency polypropylene filter. And these two are tipped together with the tipping paper. And then these two pieces are combined.

Now, the way this works is when the heat source is lit, hot gases go into the tube, into the aluminum cylinder, heat those alumina pellets that have tobacco materials on it, the aluminum tube gets very hot, and actually heats this tobacco roll, also.

Flavors from the tobacco roll, from the tobacco that's inside the substrate capsule then exit the back end of the capsule, go through the tobacco paper filter, and pick up additional flavors and nicotine, and then the smoke goes out the mouth end of the cigarette. So you're heating tobacco, you're not burning it.

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Obviously, this is a very complicated design.
Q. Now, did you -- this is a nice drawing and you've explained it from the drawing. But did you bring the real Premier cigarettes with you?
A. I did.
Q. Do you have a pack of those cigarettes?
A. Yes.

MR. BELASIC:
Your Honor, we'd like to introduce at this time Exhibit AS-000487. It's a pack of Premier cigarettes.

EXAMINATION BY MR. BELASIC:
Q. And can you hold those up?
A. (Witness complies.)
Q. Now, Doctor, would it assist you in better showing the various parts and the components of Premier that you've just highlighted here if you could take that cigarette apart and show it to the jury?
A. It would help greatly.
Q. And would you like to just show that to the jury or do you want the jurors to each have a cigarette? Which would help more?
A. It might be -- I think it would help most if each juror had a cigarette but then I was able to dissect the cigarette and show them the pieces.
Q. There's twenty in the pack; right?
A. Right.
Q. We have nineteen jurors, you can take the last one.

MR. BELASIC:
Your Honor, could Dr. Townsend do what Dr. Henningfield and some of the other plaintiffs did and demonstrate the inside of these cigarettes?

MR. BENCOMO:
Your Honor, --

THE COURT:
Are you going to introduce the package

of cigarettes and then disassemble it? Is that your -- I thought I heard you offer to introduce the pack.

MR. BELASIC:
Yes.

THE COURT:
Any objection to that?

MR. BENCOMO:
My only question is do you just have twenty cigarettes or is there like one for me?

MR. BELASIC:
Oh, I believe we have an extra pack as well. There are cigarettes for everybody.

MR. BENCOMO:
No objection, Your Honor.

MR. MICHAEL GERTLER:
You're not going to smoke it?

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MR. BENCOMO:
No.
THE COURT:
The exhibit will be received in evidence.
The second request is can the witness remove them and pass them out to the jury? Any objection to that, Mr. Bencomo?
MR. BENCOMO:
No, Your Honor.
THE COURT:
You may proceed.
MR. BELASIC:
And the third request, Your Honor, was

could Dr. Townsend take apart the cigarette? Can he stand up and walk around and show the jurors?
THE COURT:
Any objection to that?
MR. BENCOMO:
I have no objection to that as long as I'm allowed to watch him do that, also.
MR. BELASIC:
You can look over his shoulder.
MR. BENCOMO:
Well, I don't want to do that.
MR. BELASIC:
Dr. Townsend, I understand The Court has allowed you to begin your explanation.
THE WITNESS:
Okay. Thank you, Your Honor.
MR. BELASIC:
Well, let's wait until everybody gets their cigarette.
THE WITNESS:
Okay.
MR. BELASIC:
I think everyone has them, Dr. Townsend.
THE WITNESS:
May I begin?
Okay. This is a Premier cigarette. And if you'll notice, it especially looks different if you look at the front end of the cigarette. You see the heat source as I've described on this exhibit on the wall. And around the heat source is the glass mat.

Now, let me take this apart and first into the two sections that I've described on the exhibit: The smoke generation section and the filter section. Let me look first at the smoke generation section, if I may, and then I'll come back to this.
On the back side, you can see the back end of this aluminum capsule and around it is tobacco. Now, I'm going to push this out so we can see the capsule. And attached to the capsule is the heat source and the tobacco

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that was around it.
And then on the other end is the glass insulation that was around the heat source. And there's the tobacco on the back side. On the back of this aluminum capsule are two slots that allow the smoke to get out when you're heating the tobacco, okay?
Here's the glass insulation, here's the tobacco jacket that was around this aluminum capsule and the slots in the back of the capsule so the heat source fitted into the back end.
Okay. Now, let me break the capsule open and let's look at what's inside.
MR. BENCOMO:
I just wanted to see what you were doing.
THE WITNESS:
Oh, I'm glad.
MR. BENCOMO:
Thank you.

THE WITNESS:
Okay. Now, I'm pouring out the contents of what's inside the capsule. And these are the alumina beads. You'll notice that they're light brown because they have tobacco materials on the surface of the beads.
So as the heat source burns, the hot gases inside the capsule will heat the beads, dry flavors and a little bit of nicotine off the beads, and will form smoke. There's a lot of glycerin, actually, on the surface of these beads as well.
EXAMINATION BY MR. BELASIC:
Q. Well, what's glycerin, Doctor?
A. Glycerin is an inert compound that can form a smoke or form an aerosol very easily. So these are the alumina beads that contain the tobacco materials that are heated. They were inside this aluminum capsule, okay?
MR. BENCOMO:
Yes. Thank you.
THE WITNESS:
Now, let's turn to --
MR. BENCOMO:
Wait. Don't throw that away, please. I'd like for you to save it.
Thanks.
THE WITNESS:
Okay.
Now, the filter piece dropped somewhere. Oh, I put it here (indicating).
Okay. Now, if we take the filter piece

and tear it apart, and let's look at what's inside, you'll notice that mostly it's a polypropylene filter that's a very low efficiency. It's not a very efficient smoke

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remover. And that's it. And it's pretty uninteresting. It looks like a normal filter.

But this tobacco paper filter --

MR. BENCOMO:

Wait.

MR. BELASIC:

Maybe you should put that trash can somewhere else.

THE WITNESS:

We're fine.

Okay. The tobacco paper filter, you see, is a gathered piece of something that's very much like a reconstituted tobacco sheet. And the reason it's in there is to provide additional flavor and nicotine when the smoke passes through it, okay?

So you see it's just a gathered web. It's something we have a machine that gathers this down into a roll and you can fit it into the filter section, okay? This is the paper filter piece.

MR. BELASIC:

You can take that down, Bert.

EXAMINATION BY MR. BELASIC:

Q. Now, Dr. Townsend, now that you've shown the jury the actual Premier cigarette and the drawing, let's talk about what effect it had on the two goals

you mentioned, decreasing smoke chemistry and decreasing biological activity.

Have you prepared an exhibit that would help explain the difference between the type of tar that the Premier cigarette generated and the type of tar from a normal cigarette?

A. I have, yes.

Q. Would that help you explain your testimony on this issue?

A. Yes.

MR. BELASIC:

Could we put up DDA-000640, please?

EXAMINATION BY MR. BELASIC:

Q. Doctor, is that, in fact, the exhibit that gives a comparison of tar from Premier and regular tobacco burning cigarettes?

A. Yes, it is.

MR. BELASIC:

May we publish, Your Honor?

MR. BENCOMO:

No objection, Your Honor.

THE COURT:

You may publish it.

EXAMINATION BY MR. BELASIC:

Q. Now, this looks like the one we mistakenly put up the last time, so tell us what this is.

A. Right.

This is a comparison of Premier versus tobacco-burning cigarettes. And, in particular, if one looks at smoke as it passes through a very efficient filter, you'll notice that high-tar cigarettes develop a very dark brown color on that

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filter pad as the smoke passes through.
A full flavor or, actually, what's a fairly high tar today at about 20 milligrams per cigarette develops a moderately brown; a lights, a full-flavored low-tar product, you see the coloration is even less; when you get to ultra light, the color -- coloration is much less; and then the lowest category, there's very little discoloration from the tar as it passes through the filter.
But for Premier, there was no discoloration. And the reason for that is because there were no combustion products from burning the tobacco. And that's just a measure of the fact that the smoke was much cleaner chemically, it didn't produce that discoloration.
Q. So, first of all, is there less tar in a Premier than there is in a regular tobacco-burning cigarette?
A. There's less tar in Premier than most tobacco-burning cigarettes.
Q. And is the tar itself that Premier makes different, chemically different, than the tar from normal cigarettes?
A. The tar from Premier itself is very much different. It's much simpler chemistry, much -- And we call it the cleaner smoke. But it's much simpler chemistry in the tar.
Q. Okay. And you studied the smoke chemistry, of course?
A. In detail, great detail.
Q. And was that part of what you published in

that 700-page Premier monograph?
A. It's all in this monograph.
Q. Okay. And the peer reviewers reached the conclusion that you succeeded on smoke chemistry?
A. That's right.
Q. Have you prepared a chart that will explain the reduction in the kind of mainstream smoke chemicals that Premier was able to achieve?
A. Yes.
MR. BELASIC:
Your Honor, could we put up DDA-000626, please?
EXAMINATION BY MR. BELASIC:
Q. And does this chart show, in fact, the research results testing the chemical constituents of the smoke in Premier and comparing it to a reference cigarette?
A. This is a summary of some of the constituent reductions, yes.
MR. BELASIC:
Okay. Your Honor, may we publish?
MR. BENCOMO:
No objections to the demonstrative, Your Honor.
THE COURT:

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You may publish it.
EXAMINATION BY MR. BELASIC:
Q. First of all, Doctor, this, I see the source says "Premier Monograph." So am I right this research comes from the research that Reynolds published and published to the scientific committee back in '88; correct?

A. That's right.
Q. Okay. Can you tell us what that research found as far as reducing these chemicals?
A. Sure.
In this summary, I think it's clear that there's a major reduction in the constituents in smoke, the chemicals in smoke.
And as examples, let's look at nicotine, about a 62 percent reduction; hydrogen cyanide, 99.9 percent; NOx, the compound we just talked about, 95 percent; acetaldehyde, we also talked about that recently, a 93 percent reduction; acrolein is another aldehyde, formaldehyde is another aldehyde, and you see those, an 86 percent reduction and a 35 percent reduction; benzene, which is thought to be a carcinogen, a human carcinogen, is 92.7 percent reduced; toluene, benz(a)anthracene; benzo(a)pyrene is another compound we talked about, 99.1 percent reduction, that's a polycyclic aromatic hydrocarbon.
These next four are tobacco-specific nitrosamines -- and these are just acronyms for them -- but those tobacco-specific nitrosamines, you'll see, are in 90 percent plus reductions. And then phenol and acrylonitrile. So, in general, for most compounds, more than a 90 percent reduction.
Q. And these are some of the most significant compounds as far as the relationship to cancer, according to the public health community?
A. According to the public health community, these are certainly compounds of concern.
Q. And had Reynolds been trying for decades to be able to come up with a cigarette that could do

this kind of dramatic reduction?
A. Yes.
Q. Were you happy when you achieved more than a 90 percent reduction in carcinogens?
A. Oh, we were extremely happy.
Q. And what was the reaction of the public health community? Did they say "Congratulations"?
A. When this product was test marketed?
Q. Yes.
A. No, they didn't say "Congratulations." In fact, I think many people in the public health community attacked this product.
Q. Well, why would they attack it? What did they tell you?
A. I think the attacks were mainly around some of the compounds or a couple of the compounds that weren't reduced so much, like carbon monoxide. There was a big attack on carbon monoxide that's

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yielded from this cigarette. That was one of them.
Q. Are you telling me the public health community said they would rather have a cigarette with normal levels of carcinogens than a cigarette with a 90 percent reduction but still carbon monoxide?
A. I think there were a number of attacks. And that's one possible answer to it, yes.
Q. Well, did the Surgeon General of the United States take a position on whether a cigarette like this was a safer cigarette?
A. The Surgeon General, in fact, attacked this. And actually asked the FDA to assert jurisdiction over it.

Q. For what purpose; did he say?
A. To prevent its sale.
Q. Did the American Medical Association take a position on this?
A. The American Medical Association, among some other associations, took a position. And also tried to get FDA to assert jurisdiction.
Q. And, again, for what purpose?
A. To ban its sale.
Q. Now, you were fairly senior in the Research & Development Department at the time Premier came out in 1988; right?
A. Yes.
Q. And you worked on Premier?
A. I worked on Premier, not in product development but as a support area.
Q. And did you have personal knowledge, as a research scientist at Reynolds, of the reaction of the public health community to this new cigarette that you had made?
A. Yes.

MR. BELASIC:
We can take that down, Bert.

EXAMINATION BY MR. BELASIC:
Q. Well, as a cigarette designer, what was the significance to you of the reaction of the public health community to your new cigarette, Premier?
A. I'm sorry?
Q. As a cigarette designer, what was the significance to you, if any, of the reaction of the public health community to the Premier cigarette?
A. Well, to me, I mean, the significance was we

had developed a product that had major reductions in chemistry and biology. We felt like we had done something very important. We believed that this did represent a safer cigarette based on everything we knew.

And for the public health community to come out and attack it in the way that they did told me that this really flew against their agenda, went against their agenda of smoking cessation again, and that they really weren't interested in a safer cigarette in the marketplace.

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MR. BELASIC:
Your Honor, I'd like to bring up Exhibit AZS-000228.
And this document has been previously admitted with Dr. Henningfield.
EXAMINATION BY MR. BELASIC:
Q. All right. Doctor, Dr. Townsend, have you seen this document before, which was previously admitted into evidence?
A. Yes, I have.
MR. BELASIC:
Okay. Your Honor, may we publish?
MR. BENCOMO:
No objection, Your Honor.
THE COURT:
You may publish it.
EXAMINATION BY MR. BELASIC:
Q. Doctor, as you'll note --
MR. BELASIC:
First of all, Bert, could you highlight the title, the three lines from the title

there, and blow that up?
EXAMINATION BY MR. BELASIC:
Q. Do you see this is from the Office on Smoking and Health? Now, what is the Office on Smoking and Health, Dr. Townsend?
A. It is a part of the CDC.
Q. And that's a part of the Centers for Disease Control?
A. That's correct.
Q. And that's part of the federal government?
A. Yes, that's correct.
Q. So this was a federal government health agency meeting. And what does it say the meeting was on?
A. "New Tobacco Products."
MR. BELASIC:
Could you turn to Page 2, Bert? And could you highlight --
Your Honor, may we publish? I'm sorry.
THE COURT:
Yes, you may publish.
MR. BELASIC:
Could you highlight in the second paragraph the first two sentences, please?
EXAMINATION BY MR. BELASIC:
Q. Now, Doctor, looking at your copy, can you tell us who this Ms. Wilkenfeld at this government meeting is?
A. Yeah, Judy Wilkenfeld actually was a lawyer with the Federal Trade Commission for many years. Subsequently, she went with the or she was on assignment to FDA. And I think she's now with a

private agency.
Q. All right. So the government, in a meeting discussing the design of new cigarette products, brought a lawyer --

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A. Yes.
Q. -- is that right?
A. That's correct.
Q. Okay. And what did this lawyer say about Reynolds' Premier cigarette?
A. The document says, "Ms. Wilkenfeld discussed the Premier cigarette, a new product advertised as a safer smokeless cigarette. She believes that Premier failed because of poor publicity and bad taste."
Q. Now, let me ask you a question about that.
Based on your personal knowledge, where did the poor publicity about Premier come from? You were there.
A. It came from attacks on the product, primarily by the public health community.
Q. And Ms. Wilkenfeld is a lawyer for that same public health community; correct?
A. She was with the Federal Trade Commission and then, later, with the FDA.
MR. BELASIC:
Your Honor, could we publish Page 3, the next page?
THE COURT:
You may publish it.
MR. BELASIC:
Can you highlight the first sentence of the third paragraph, Bert? Just that first

line.
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, do you see that Jack Henningfield was present at this government meeting?
A. Yes, I see that.
Q. And you know that he was a plaintiffs' witness here?
A. Yes.
Q. And you've read his testimony?
A. I've read portions of it.
Q. He was not a supporter of Premier; was he?
A. No, certainly not.
MR. BELASIC:
Bert, could you highlight the first two sentences in the next paragraph, please?
EXAMINATION BY MR. BELASIC:
Q. Doctor, I'd like to read this to you and then ask you a question based on your knowledge about Premier.
It says here that "The panel was concerned about the ramifications of a cigarette that is actually safer than the current cigarettes."
My first question: It doesn't say a cigarette that might be safer or that they were concerned about a cigarette that could be safer; correct?
A. That's what it says.
Q. It says they were concerned about a cigarette that was actually safer?
A. That's what this document says.
Q. Now, do you have any personal knowledge of why the United States Government would be concerned

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about a cigarette that was safer?
I don't want you to guess. Do you have any idea?
A. I don't have an idea, no.
Q. Is it something that fits in with your goal of making a cigarette that is safer?
MR. BENCOMO:
Objection, Your Honor. May we approach?
THE COURT:
You may approach.
(Whereupon a bench conference is held at this time as follows:)
THE COURT:
Mr. Bencomo.
MR. BENCOMO:
Yes, Your Honor. Thank you.
My objection is the witness just said that he had no idea. Mr. Belasic is trying to get the answer indirectly that he could not get directly. That's the basis for my objection.
THE COURT:
Let's see what he said.
MR. BELASIC:
After he said he had no idea, I then did not ask him what he thought the government was doing. I asked him what the government said was consistent with his personal knowledge.
THE COURT:
(Addressing Mr. Belasic.) Come read your question. Do you know what your

question was?
MR. BELASIC:
Okay. I'll withdraw it.
THE COURT:
He's going to withdraw that question and rephrase it.
MR. BENCOMO:
Okay. You're going to state for the record that he withdraws it?
THE COURT:
He's going to do that.
(Whereupon the bench conference is concluded at this time.)
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, as you probably saw, I read my question. I think I should rephrase it.
When the government memo here said that the panel was concerned about a cigarette that is actually safer than current cigarettes, your goals at R. J. Reynolds, are you concerned about developing a cigarette that is safer, that is actually safer?
A. Of course we're concerned about developing safer cigarettes, one that is actually safer.
Q. And is that because you want to do it?

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A. Absolutely.
Q. It's not something that would scare you or would worry you that it would come out; right?
A. That is our goal is to develop a safer cigarette.
Q. Now, do you see that the government document here, the second sentence says, "The Premier studies

indicated that the cancer risk associated with smoking Premier was lowered significantly, but not the risk of heart disease."
So the government memo here wasn't attacking the Premier studies that you published; correct?
A. No. In fact, --
MR. BENCOMO:
Your Honor, objection. May we approach?
(Whereupon a bench conference is held at this time as follows:)
THE COURT:
Mr. Bencomo.
MR. BENCOMO:
Thank you, Your Honor.
My objection is that he can't interpret what the government is saying or what the government is thinking or what the government -- That is not his role or function. He is an RJR employee who was a chemist in the area of research and development. The question was the government, et cetera, et cetera.
THE COURT:
Let me read the question.
I think it's an appropriate question given the fact that he published studies showing that the cancer risk of this cigarette and the tar risk is much lower. And they're not attacking that, they're not quarreling with it.
The objection is overruled.
(Whereupon the bench conference is concluded at this time.)

THE COURT:
The objection is overruled.
And here is the question: "Now, do you see that the government document here, the second sentence says, quote, 'The Premier studies indicated that the cancer risk associated with smoking Premier was lowered significantly, but not the risk of heart disease,' closed quote. So the government memo here wasn't attacking the Premier studies that you published; correct?"
THE WITNESS:
The answer is that is correct, it was not attacking the studies that we published.
EXAMINATION BY MR. BELASIC:
Q. In fact, wasn't the government memo here saying that your studies on Premier indicated that the cancer risk was lowered and lowered

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significantly?
A. That is what this says.
And, frankly, it goes beyond what we at R. J. Reynolds would say. Because we believe that the studies indicate that Premier is probably safer. I don't think we would go as far as to say that it's actually safer and that it does represent a significant risk reduction. We think it probably is based on the evidence.
Q. So based on this internal government memo, is it fair to say that their conclusion was that Premier was safer than you thought it was?
A. Yes.
Q. Now, just so we're not confused, it's a good

thing to make a cigarette that lowers the risk of cancer; right?
A. Absolutely.
Q. Something that everybody should want to do?
A. Yes.
MR. BELASIC:
All right. Let's turn to the next page.
Actually, let's turn to Page 8.
Your Honor, could we publish Page 8?
THE COURT:
You may publish.
EXAMINATION BY MR. BELASIC:
Q. Dr. Townsend, could you look at the last paragraph? And do you see that that paragraph --
Could you highlight that paragraph for us, Bert?
And do you see that the last paragraph talks about what someone from the Food and Drug Administration was saying? Do you see that?
A. Yes.
Q. And do you see that someone from the federal government's Food and Drug Administration was making comments about Premier? Do you see that in the second-to-last sentence?
A. Yes.
Q. And just so you and the jury can follow along, you see that the second-to-last sentence says, "Mr. Budich said that the FDA was moving towards banning Premier when it was pulled off the market."
Is that consistent with your personal knowledge of the federal government's reaction to

your new product?
A. Yes, that is consistent.
Q. So let me get this straight.
The same federal government that was saying it lowered the risk of cancer significantly was moving to ban it?
A. That's correct.
Q. Does that make any sense to you?
A. It doesn't make any sense to me whatsoever.
MR. BELASIC:
You can take that down.

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EXAMINATION BY MR. BELASIC:
Q. Did R. J. Reynolds, in the face of this opposition, this potential ban, did you nonetheless go out and try to sell this cigarette?
A. We did. We test marketed Premier.
Q. Can you tell the jury what test marketing is, at least when it comes to cigarette brands?
A. Right.
A test market is actually marketing it in one area or a fairly broad location but certainly not national. So in the case of Premier, we took it to three cities: St. Louis, Tucson and Phoenix. And in those areas, those three areas, there was widespread distribution, there was also advertising and other marketing for Premier.
Q. And as the Executive Vice-President of Research & Development at R. J. Reynolds, do you have personal knowledge of how the test marketing fared and how consumers reacted to this cigarette?
A. Yes.
Q. And can you share with the jury what happened

when they sold Premier in the test markets?
A. Sure.
What happened in all three test markets was this product failed in the test market. It failed for a couple reasons. One was the taste really was different.
And you can imagine when you're heating tobacco and not burning it, you're going to get a very different taste. Consumers, many consumers didn't like that taste. Some got used to it but not many.
Another, another factor was the product doesn't burn down. When you smoke it, only that carbon tip burns. And it was a very difficult adjustment for many smokers to get used to a product that doesn't burn down. It stays the full length. It just quits generating smoke after awhile. So there were some major differences in the product.
And then a third factor was that there was quite a lot of press in those test market areas, especially about the attacks on Premier, and people were very concerned about that.
Q. Now, obviously, you wished that Premier had succeeded; correct?
A. Absolutely.
Q. Remember when we were talking about the profit motive?
A. Yes.
Q. If Premier had succeeded, if a cigarette that the federal government said could have lowered the cancer risk significantly, was popular with smokers, R. J. Reynolds could have made a lot of money;

correct?
A. Absolutely.
Q. And that would have been a lot of money for everyone concerned with R. J. Reynolds?

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A. We could have made a lot of money and it would have made an important difference for smokers.
Q. It's because the profit motive in this case is towards safer cigarettes; right?
A. Yes.
Q. You don't make any money for making cigarettes that are higher risk; do you?
A. We do everything we can to make sure that we don't make cigarettes that are higher risk.
Q. Just finally, because we have a few minutes before break, one of plaintiffs' experts said you could have made Premier in the 1960s.
Is that true?
A. No, that's not true at all.
In fact, some of the technologies that are in Premier were invented right before the development of Premier which allowed us to do this. An example is the alumina beads was a relatively new material.
The machinery to insert the heat source into that aluminum capsule is something that we had -- we developed together with some new equipment manufacturers that we had never worked with before, like Bosch, who makes automobile equipment and stuff, so --
Q. Let me stop there.
Are you saying you had to make -- you had to invent new machines to even make what went into the Premier cigarette?

A. We had to invent totally new machines to make this thing and worked with a number of different suppliers, design engineers and our own internal design engineers and people to actually make this happen.
But some of the materials just simply weren't available before the 1980s, like the alumina beads, which were very important in how that product performed.
Q. How many patents were awarded for Reynolds' work with the Premier?
A. There were at least forty. Somewhere, I would say, between forty and fifty patents.
Q. Now, even after it failed and it was nearly banned, did you give up and not explore the goal of this heated tobacco cigarette?
A. No, we didn't give up.
We actually took this off the test market in those three cities. And based on what we had learned in the test market from consumers, talking to consumers about, you know, the taste problem and, you know, the other problem with it not burning down and all that, we set about trying to modify Premier to make it more consumer acceptable.
Q. Would it be fair to say you tried to make a new and improved Premier that would be more acceptable to people who smoked?
A. That's basically right, yes.
Q. And what was the name of that new and improved Premier?
A. Well, ultimately after a few years of development work, we came up with another product

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that was called Eclipse or has been called Eclipse.
Q. And we're just about to break and we can talk about Eclipse tomorrow. But can you buy Eclipse in stores here in New Orleans today?
A. Yes, it's in limited distribution. I think there's two convenience outlets that are carrying Eclipse, Circle K and 7-Eleven.

MR. BELASIC:
Your Honor, I'm about to move into this new topic. I think it's a good time.

THE COURT:
We'll recess for today at this time, ladies and gentlemen. We'll reconvene at 9:30 tomorrow morning, as usual.
(Whereupon the jury is excused at this time.)

THE COURT:
Let the record reflect the jury has been discharged for the day.
Anything for the record by plaintiffs' counsel?

MR. BENCOMO:
No, Your Honor.

THE COURT:
Defense counsel?

MR. LONG:
No, Your Honor.

THE COURT:
On the exhibits that were offered by Mr. Bruno on April 30, and to which Mr. Schneider objected in part and as to which some conference has occurred, I'm ready to rule on

those exhibits.
Exhibit 11366, objection sustained.
1882.01, I understand that there's no objection to that one as redacted; am I correct?

MR. SCHNEIDER:
Well, we did object to it because it wasn't referred to by name and shown to the witness. We made that objection. Which we objected to them all on that ground. But if Your Honor is going to admit it, then just the portions that we had redacted will be admitted.

THE COURT:
Well, I'll have to revisit that.
Exhibit 1961.01, the objection is overruled. It will be received in evidence.
Exhibit 806.01, the objection is overruled. It will be received in evidence.
Exhibit 4741.01, the objection is overruled. It will be received in evidence.
Exhibit 4788.01, the objection is overruled. It will be received in evidence.
Exhibit 2871.02, the objection is overruled. It will be received in evidence.

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MR. SCHNEIDER:
And, Your Honor, of all those you just read, 1961 through the last one, that's just the portions, the redacted portions that we agreed on this morning?
MR. BRUNO:
Yes.

THE COURT:
Yes, I understood you had agreed on the redactions of those exhibits.
Exhibit GK-100254, the objection is overruled. It will be received in evidence.
GK-000487, the objection is overruled. It will be received in evidence.
All of the following exhibits, as to all of the following, the objection to the exhibit is sustained: 0913, 0972.02, 1383.02, 1395.02, 1377.02, 1396.02, 1174.01, 1398.02.
I believe I've addressed all of them.
MR. SCHNEIDER:
That matches my records, Your Honor.
THE COURT:
If not, let me know tomorrow. And I will revisit the Exhibit 1882.01 and rule on that tomorrow.
MR. SCHNEIDER:
Well, Your Honor, just to make things simpler, that falls in the same category as the others you read, 1961, 806. It's one that was objected to on the same grounds, we redacted it down, and if the others went in, it ought to go in, too.
THE COURT:
So ordered.
MR. RUSS HERMAN:
Your Honor -- Oh, I'm sorry.
THE COURT:
Mr. Herman?

MR. RUSS HERMAN:
Yes, Your Honor.
It's late in the day. But I did indicate to Your Honor that I would provide you with a prior transcript in which Mr. Gay elicited that Philip Morris had spent a billion dollars or a billion and a half dollars in research.
That's at Page 15071 of the transcript of June 18th -- I'm sorry, of February 26th, 2003. That's at 15071 of February 26th, 2003. And I won't argue it. I just note for the record that this is the third witness that has talked about research and then got into marketing and advertising.
MR. BENCOMO:
Your Honor, if I may just --
MR. WILLIAMS:

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Your Honor, --
MR. BENCOMO:
Excuse me, Jack, if I may just finish that thought. If I may just amplify on that, this witness not fifteen minutes ago was asked about the Premier. And he testified that it was test marketed at St. Louis, Tucson and Phoenix.
He was specifically asked: Well, what did y'all do? He said: We advertised it all over, et cetera, et cetera. And then he says: Well, it failed because....
So he is entitled to give whatever he perceives to be the reasons why it failed,

yet we can't or are not allowed to bring up the issue of the real reason for the failure, which has to do with the expenditures on advertising, et cetera, et cetera.
So they have continued to open the door on that issue, not just through this witness but also, as Mr. Herman indicated, because of what Mr. Gay indicated. And we continue to be precluded from addressing that issue with their witnesses.
MR. RUSS HERMAN:
I'm mindful of Your Honor's direction, and we are preparing a motion so that the matter can be put properly before The Court.
MR. BELASIC:
Your Honor, may I respond very briefly?
THE COURT:
If you'd like to. There's no motion before The Court. I understand a motion is coming and I'll have a hearing. But you can place of record comments, if you'd like to.
MR. BELASIC:
I think for the reasons you have stated in denying similar requests and a similar motion, it doesn't link up. Dr. Townsend is not talking about advertising. He has personal knowledge of whether it failed. He said consumers didn't like it. He's read the research reports where people said it tasted like a bad cigarette.
So his statements no more open the door to the total advertising budget of Reynolds

than some chemist's statements about some other cigarette relate to Joe Camel. I mean, they're not related.
THE COURT:
Anything for the record by either side before we recess?
MR. RUSS HERMAN:
No, Your Honor.
MR. WITTMANN:
No, Your Honor.
THE COURT:

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All right. We'll recess until tomorrow morning.

(Whereupon the proceedings were adjourned at 4:06 o'clock p.m.)

* * * * *

REPORTER'S CERTIFICATE

I, CHERYL FOURNET HUFFMAN, Registered Merit Reporter, in and for the State of Louisiana, as the officer before whom this testimony was taken, do hereby certify that this testimony was reported by me in the stenotype reporting method, was prepared and transcribed by me or under my personal direction and supervision, and is a true and correct transcript to the best of my ability and understanding; that I am not related to counsel or to the parties herein, nor am I otherwise interested in the outcome of this matter.

_____

CHERYL FOURNET HUFFMAN, RMR, CRR
Registered Merit Reporter
Certified Realtime Reporter
(No. 75009)
Huffman & Robinson, Inc.
One Shell Square, Suite 250 Annex
701 Poydras Street
New Orleans, Louisiana 70139
(504) 525-1753 (800) 749-1753

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